

ABSTRACTS FROM REPORTS
ON
CARIBOO DISTRICT

MADE BY
BRITISH COLUMBIA LAND SURVEYORS TO
THE DEPARTMENT OF LANDS

1891—1927



Published by authority of
THE HONOURABLE F. P. BURDEN
Minister of Lands

VICTORIA, B.C.:
Printed by CHARLES F. BANFIELD, Printer to the King's Most Excellent Majesty.
1929.



MOUNT ROBSON, FROM SITE OF SPECIAL MONUMENT TO COMMEMORATE COMPLETION OF
SURVEY OF ALBERTA-BRITISH COLUMBIA BOUNDARY.

FOREWORD.

THE general reports of surveyors employed by the Department of Lands have from time to time been incorporated in the annual reports of the Minister. As only a limited number of these reports were printed each year the majority of them are out of print. As they contain a large amount of detailed information as to the natural resources of the Province it has been decided to republish them in separate pamphlets, segregated into districts. This pamphlet, covering the Cariboo District, contains all the existing land surveyors' reports on various sections of this district to date.

In order to reduce the volume of the publication certain portions which are not of special interest to the general public have been eliminated and only extracts covering the more or less important portions of the reports are herein published.

J. E. UMBACH,
Surveyor-General.

January, 1929.

GENERAL DESCRIPTION OF CARIBOO DISTRICT.

GENERAL DESCRIPTION.

The Cariboo District is bounded on the west, except in the Nechako Valley, by the 124th meridian of longitude. The south boundary commences at the intersection of this meridian with the 52nd parallel of latitude and follows this parallel east for about 150 miles; thence it turns northerly along the watershed of the Clearwater River to the watershed of the Upper Fraser. From this point it turns south-easterly along the watershed of the Fraser and Canoe Rivers and crosses the valley of the Canoe River to the eastern boundary of the Province. The north-easterly boundary follows the boundary-line between Alberta and British Columbia as far as the 120th meridian of longitude, and thence follows the watershed of the Parsnip River and the Finlay River to its intersection with the 124th meridian. The whole of this boundary is along the summit of the Rocky Mountains.

Along the north-westerly boundary of the district is a wide valley bounded by the foot-hills of the Rockies to the east and on the west by the Cariboo Range (or Gold Range, as it is locally known) and its continuation north-westerly, where it forms the watershed of the Parsnip and Finlay Rivers. This valley is a continuation of the Columbia River Valley and continues in a northerly direction to the valley of the Yukon River. At Giscome the valley of the Fraser River leaves this valley and turns almost due south, being joined at Prince George by the wide valley of the Nechako River. At this point the junction of these three valleys forms a wide area of low-lying country well adapted to all classes of farming.

On the west side of the Fraser River, from Quesnel south to the 52nd parallel of latitude, a wide plateau extends to the western boundary of the district. This plateau is somewhat heavily timbered in the north, but becoming more open towards the valley of the Chilcotin River in the south. All this part of the district is well adapted for cattle-raising, as is also the country around Williams Lake and the 150-Mile House on the Cariboo Road. The Fraser River in its course through the Cariboo District from the Yellowhead Pass to where it crosses the 52nd parallel of latitude forms, roughly, two sides of an equilateral triangle. Nearly the whole of this triangle is very rough and mountainous, except for the valley of the Fraser and the tributary valleys of the Quesnel, Willow, and Bowron Rivers. Through this part of the district runs the Cariboo Range, which is the northerly continuation of the Selkirk Mountains, and in this range gold was discovered, hence its local name of Gold Range.

CLIMATE.

With regard to the climate, the temperature in the daytime varies from 60° to 85° F. in the months of June, July, and August. Occasional summer frosts occur all over the district, but these are becoming rarer in the more settled portions along the lines of the Canadian National and the Pacific Great Eastern Railways. The winters are cold; the temperatures falling at times to 30° below zero during the months of December, January, and February, but these extremes are usually confined to short periods.

GAME.

Game is plentiful all over the district. Moose, which before the building of the Grand Trunk Railway were very plentiful in the Upper Fraser Valley, have been driven back to the Cariboo Range and into the Parsnip and Finlay Valleys. Bear, both black and grizzly, are numerous. Deer, which were frequently seen in the Nechako Valley and along the Fraser from Giscome to Quesnel, are becoming scarcer with the coming of settlement. Small game, grouse, and rabbits abound almost everywhere. The lakes and streams are well stocked with fish.

COMMUNICATION.

The district is reached by two lines of railway—the Canadian National, which follows the valleys of the Nechako and Upper Fraser Rivers, and the Pacific Great Eastern, which traverses the Lower Fraser River to Prince George. There are numerous good roads connecting

all the settlements in the district, the chief of which is the Cariboo Road, running to Barker-ville, which was commenced in 1860 and completed in 1864. Other main roads are those from Quesnel to Prince George and Prince George to Hazelton.

MINING.

Gold was first discovered in the Cariboo District by Aaron Post, a California miner, in 1858. In 1859 gold was discovered in the Quesnel and Horsefly Rivers; Antler and Keithley Creeks were discovered in 1860, and Williams and Lightning Creeks in 1861. Since that time gold-mining, both placer and quartz, has been successfully carried on, though the richer placers have long ago been worked out.

FARMING.

The principal industry in the Cariboo District is farming. The valleys of the Nechako and its tributary streams, the Stuart and Chilako, are rapidly being brought under cultivation. The principal towns in this part of the district are Prince George and Vanderhoof. All along the line of the Canadian National Railway to the east of Prince George, in the valley of Eaglet Lake, and along the Upper Fraser, mixed farming is being carried on successfully.

Along the Fraser River below Prince George, as far south as Soda Creek and in the valleys of the Willow, Cottonwood, and Quesnel Rivers, there are large areas of good farming land. Quesnel is the principal town in this part of the district.

In the south-west part of the district Williams Lake, situated on the Pacific Great Eastern Railway, is the chief town, and in this vicinity, and on the west side of the Fraser River and in the valley of the Chilcotin River, cattle-raising is being successfully carried on.

LUMBERING.

Since the building of the Canadian National Railway lumbering has become an important industry in the Cariboo. The best timber is found on the Upper Fraser, on the foot-hills of the Rockies and the Cariboo Range, the timber consisting principally of spruce, fir, and cedar. Along the Nechako River also there are large areas of merchantable timber and many sawmills have been built along the railway. Good timber is to be found also in the valley of the Salmon River, north of Prince George, and in the vicinity of McLeod Lake. To the north, in the valley of the Parsnip, there is little good timber except on the foot-hills of the Rockies, to which at present there is no means of transportation.

There is a great quantity of good pulp-timber in all these districts, and as there is no lack of water-power there should be a great future in the Cariboo for this industry.

There is practically no fir in the valleys of any of the streams which drain into the Arctic Ocean.

EARLY HISTORY.

The first white man to cross British Columbia, and at the same time the Cariboo District, which is the subject of this bulletin, was Sir Alexander Mackenzie, who, by his remarkable journey in 1792 and 1793, claimed this Province for Great Britain. Sir Alexander left his winter quarters on the Peace River below the Grand Canyon on May 9th, 1793. He ascended the Peace and Parsnip Rivers, crossed the divide, and descended the McGregor and Fraser Rivers to an Indian village now known as Alexandria. Here he stayed for a short time and, finding that he could not navigate the Fraser to the Pacific Ocean, he returned to the Blackwater River, left his canoes, and travelling by the valleys of the Blackwater, Chilcotin, and Bella Coola Rivers, reached the Pacific Coast on July 20th, 1793, at the head of the North Bentinck Arm of Burke Channel.

The next explorer to visit Northern British Columbia was Simon Fraser, who, in 1806, travelled by the same route as Sir Alexander Mackenzie as far as the mouth of the Nechako River, where Prince George now stands. He ascended this river and its tributary, the Stuart River, to Stuart Lake, which he named after his companion, John Stuart, and established there the Hudson's Bay post of Fort St. James.—"British Columbia from Earliest Times to the Present," by E. O. S. Schofield and F. W. Howay, 1914.

EXTRACT FROM THE REPORT OF N. B. GAUVREAU, C.E., 1891.

[Mr. Gauvreau was employed by the British Columbia Government on an exploration of New Caledonia; and during the summer of 1891 he travelled through the Cariboo and Cassiar Districts.]

FROM STUART LAKE TO McLEOD LAKE.

The distance from Stuart Lake to McLeod is $64\frac{1}{2}$ miles by the trail. For the first 12 miles the country traversed is much open; there are fine meadows in which the Indians cut hay; the ground gradually rises to an altitude of 550 feet above the lake. Looking towards the north-west the ground looks very level, except one solitary mountain, at an elevation of 1,200 feet above the plateau. Beyond this, at a distance of 20 miles from the trail, a long, low chain can be seen. On the south-east a low chain is visible in the distance at about 25 miles, running north-easterly. Beyond that distance the country is more broken, and the first growth of timber has all been burnt. The trail crosses the Salmon River, which is here a sluggish stream of 20 yards wide, taking its source at a distance of 20 miles in a north-westerly direction in a low marshy country, and runs towards the Fraser River, into which it falls at $15\frac{3}{4}$ miles above Fort George. The country traversed by this river and its numerous feeders is low and swampy, and is looked upon as one of the best trapping-grounds for beaver.

At $1\frac{1}{2}$ miles beyond the Salmon River the trail crosses a sluggish stream of 12 yards wide, three times in succession, called the White Mud, and is a feeder of the Salmon; it takes its source in a small lake $6\frac{1}{2}$ miles north of the trail. Three miles beyond the last crossing of the White Mud the Swamp River is reached; it is one of the big feeders of the Salmon; it takes its water at 10 miles north-westerly from the trail, in a series of small lakes and swamps, runs for 6 miles in a direction S. 80° E., and then turns almost south and empties in the Salmon at 25 miles from the trail. Between Swamp River and Lac la Carpe (now Carp Lake), a distance of $6\frac{3}{4}$ miles, the trail runs over the plateau, dividing the watershed of the Fraser or Pacific, and the stream going into the Parsnip and then to the Arctic Ocean. It is a space cut up by gravelly ridges, and where the only vegetation now is black pine (*Pinus contorta*); its elevation, by aneroid, is 3,080 feet above sea-level. Lac la Carpe is a beautiful sheet of water, of $6\frac{1}{2}$ miles in length and $2\frac{1}{2}$ wide; a low chain of hills follows the lake at a distance of 5 or 6 miles from it to the south-east. Another chain similar to this can be seen, but lying about 18 miles towards the north-west. The country was all burnt over, but on the south-east there is a heavy second-growth. Lac la Carpe empties into Long Lake (now War Lake) by a small stream of 3 miles in length; this latter is $2\frac{1}{4}$ miles long by 40 chains wide. The Long River drains it into McLeod Lake; it is a stream of 40 yards wide and 2 feet deep, and is now known as the McLeod River.

A short distance after the trail has crossed the river, at a distance of 17 miles from McLeod Lake, the river breaks into a magnificent fall of 125 feet, 80 feet perpendicular, and the rest cascade-like. The country nearing McLeod Lake slopes gradually towards it and is more open; there are patches of good grass and rich pasture.

A chain of mountains is visible to the north-west, towards the Parsnip. All the region traversed by this trail is almost completely denuded of its first growth of timber; thickets formed of the usual species, like balsam poplar (*P. balsami fera*), aspen poplar (*P. tremuloides*), birch (*B. glandulosa*), and especially black pine (*P. contorta*), cover the ground. It seems to be much exposed to summer frost, and little or no land could be used for farming; clearing and draining may yet improve the country to such a point that good pasturage could be utilized and vegetables and hardy grain grown.

McLEOD LAKE.

The length of McLeod Lake is $16\frac{3}{4}$ miles and $1\frac{1}{2}$ miles wide; it is very deep. On the west the shores are thickly wooded and rise by steps to the general level of the country, extending towards Stuart Lake. This region is traversed by a trail from Fort St. James to McLeod Lake. On the east the ground rises gradually to a chain of heights of an elevation of 1,200 feet above the lake, its opposite slope leaning towards the Parsnip River. On the east the timber is fair—spruce, Douglas fir, Canadian balsam, birch, poplar, and near the water cotton-wood, willows, alders, etc.

McLeod Lake is on the route of the fur trade, from the Fraser River to the Peace River, by the Parsnip, Crooked River, the principal feeder of McLeod Lake, being followed. A descrip-

tion of this route can be given in a few words. Big flat boats holding several tons are towed up the Fraser from Soda Creek to Giscome Portage, and loaded on similar boats, on the Crooked River, which then proceed to McLeod Lake, Pack River, the Parsnip, and the Peace Rivers. Messrs. Dunlevy and Davies, from Soda Creek, keep up an extensive trade across the Rockies by that means.

CROOKED RIVER.

The length of this river, from its head to McLeod's Lake, is over 45 miles; it is 40 yards wide at its mouth, and there is a succession of three lakes, of $2\frac{1}{2}$ to 3 miles in length and an average width of 60 chains; in the lower 20 miles the banks are low and composed of silt, thickly covered by alders and willows. The upper 25 miles to the summit are very crooked, and the banks are very low and cut up in numerous arms and channels, making it sometimes hard to find the main river. There are numerous hay meadows in the neighbourhood. Beyond the valley the country is undulating and timbered; it seems much exposed to summer frost.

At 20 miles from the mouth the Swamp River comes from the east; it takes its water near the head of the Parsnip. The country which it traverses is low at its mouth and more broken farther up.

GISCOME PORTAGE.

The Crooked River takes its source in Summit Lake, measuring 4 miles long by 2 wide; it is $7\frac{1}{2}$ miles distant from the Fraser. Three and a half miles from the lake is the division between the two watersheds—the Arctic and Pacific. The country on the divide appears level; it is cut up by gravelly ridges, then it slopes gently towards the Fraser.

The general appearance of the country, the soil, the flora, all tell that a more genial country is reached; it is more open, the soil richer, and the vegetation more luxuriant.

FROM GISCOME PORTAGE TO FORT GEORGE.

The Fraser River at Giscome Portage is a noble stream, with a steady current of about 3 miles an hour; towards the east the banks are rather high and timbered; on the west it rises more gradually towards the heights near the Salmon River. The country is covered with thickets of poplar and birch, and has many reaches of open and partly open grassy flats. Below the Salmon, also, numerous flats covered with alders and willows could be utilized. On the east many benches well timbered are formed, of very good soil, and fit for farming.

At $28\frac{1}{2}$ miles from the Portage Fort George is reached. It is a Hudson's Bay Company's post, beautifully situated. At this point the closing with last year's exploration was made.

PACK RIVER.

McLeod Lake empties into the Parsnip by a stream known as Pack River. Its length is $17\frac{1}{4}$ miles and its current has a rate of $2\frac{3}{4}$ miles an hour. The banks of the river are generally low. At $6\frac{1}{4}$ miles from McLeod the river expands into a very fine lake, of $2\frac{1}{4}$ by $1\frac{1}{2}$ miles. Its name is Lac la Truite, or Tu-ta-yah; it is surrounded by low hills, well wooded. From the outlet of the lake to the Parsnip there are a couple of rapids with large boulders. On the north-east the country is low and wooded for a couple of miles, then rises to a range between the Pack and the Parsnip. On the south-west the flat country, generally burnt, seems to keep on for a long distance. The soil is generally a very light loam, lying on gravel, the vegetation generally poor, and in the open the grass seems very rank—peavines, "red-top," vetches, etc. There is a fine meadow on the river near McLeod Lake, where the natives cut a good quantity of hay.

PARSNIP RIVER.

The Parsnip River is a wide mountain stream, which takes its source in the Rocky Mountains and then runs at their base for all its distance. Its head is in a small lake, from which a short portage crosses to the source of one of the feeders of the Fraser; its upper part was not explored this season. From the junction of the Pack River to the point where the Parsnip and the Finlay unite to form the great Peace River the distance is $65\frac{3}{4}$ miles and the average width of the stream is 150 yards. The current has an average of $2\frac{1}{2}$ miles an hour. In September the water was very low, and at some places it was difficult to pass the canoe over the bars. By the marks left on its banks the high water seems to be 15 to 18 feet higher. Numerous bars and islands are formed and the river is sometimes cut up into several channels. These

islands, as soon as sufficient debris is accumulated on them, get covered with a thick vegetation of willows (*Salix longipolia*), but often the flood of another year carries them away. The name of the river comes from the abundance of cow-parship (*Heracleum lanatum*) growing on its banks (Prof. Macoun).

The banks are generally low and well wooded. Towards the south a distant range of hills is seen; to the north-east the ground is flat, but rising slightly towards the foot of the Rockies, 12 to 14 miles distant.

At 29¼ miles from the mouth of the Pack River the Nation River comes from the west. It is one of the large tributaries of the Parsnip and takes its source in a chain of lakes beginning near Takla Lake. It drains a very extensive country, which in every particular resembles the region around Takla Lake and Middle River. It is a shallow stream, running over gravelly bars, and its general direction is N. 70° W.

From the mouth of the Nation to the Finlay the distance is 39½ miles and the velocity of the current averages 3 miles an hour. The banks get higher and bluffs of clay and stratified gravel and clay are common.

Towards the south-west a range of mountains, 1,000 feet above the river and running in the same direction, keep for about 12 miles. Beyond these the country is low and gently undulating, extending in the distance towards the Wet-yea or Cariboo Range. As the Parsnip gets nearer to its mouth the distance to the Rockies diminishes sensibly, and the ground is thickly timbered up to the slope of the latter. At the junction of the Parsnip and the Finlay there is a vast expansion of water, in which the water of the Parsnip is recognized by its bluish tint. The two rivers, after joining, form the majestic Peace River, which enters the Rockies through a most picturesque pass, the high summits on each side being plainly visible. Towards the east, at 10 miles, Mount Selwyn, with its snow-clad top, is prominent.

The soil along the Parsnip is generally a thin loam, with a clay or gravelly subsoil. There are numerous swamps and hay meadows. Along the flats the cottonwood attains to a very large size (*P. canadensis*), spruce (*Albies alba*), birch (*B. papyracea*), willows (*S. longifolia*), alder (*A. incana*, *A. viridis*). The spruce, cottonwood, and birch are of remarkable size. The climate, according to information, is very cold and severe in winter and the snowfall considerable. It is also exposed to summer frost, and very little, if any, land can be looked upon as fit for agriculture, at least for a long time, until it pays to clear the timber and drain the soil.

NATION RIVER.

The Nation River takes its head in a group of three lakes, known as Kwi-ni-ca; then a small stream of 3½ miles falls into a lake called Tsé-té-ba-bon, or Nation River Lake, as it is generally taken for the source of the Nation. This lake is 8 miles in length and 1 mile wide, and is fed by several mountain streams. A river of 2 miles in length brings its water into Nitata Lake, which is 6 miles long, with a width of 20 chains. A short stream of 1½ miles drains Nitata into Choo-chi-bon Lake, an extensive sheet of water of 15 miles by 4½. Finally, this lake empties into Choo-chi by a stream of half a mile. The length of this last lake is 7 miles, by 1 mile wide. Below this the Nation River is crossed by the trail from Stuart Lake to Omineca. From the old ferry to the Parsnip River the Nation runs through a generally low and undulating woody country, much similar to the region described along the Parsnip. It crosses the low chain of mountains known as McLeod's Range, to the south, and Cariboo Range, to the north.

EXTRACT FROM THE REPORT OF J. F. TEMPLETON.

DATED JANUARY 10TH, 1908.

[Mr. Templeton was employed in 1907 by the British Columbia Government in making surveys on the Chilako River (formerly known as the Mud River) in the vicinity of the Telegraph Trail from Quesnel to Fraser Lake.]

The country following the Mud (now known as the Chilako) River eastward from the Telegraph Trail consists mainly of bench land rising gradually from the river's course to the foot-hills of the Bear and Bobtail Mountains. With a few scattered beaver meadows and small prairies, the valley is wooded for the most part with small black pine and poplar on the benches, dense underbrush in the river-bottoms, and scattered fir with scrub spruce on the higher ground.

Along the river-bottoms the soil is very rich and deep, with occasional sandy tracts. The benches are of brown sandy loam, with clay subsoil. On the higher land traces of rock and gravel appear with the fir and small spruce. The greater portion of the valley should be cleared for cultivation at a reasonable cost to the settler, the country having been swept by fire several years ago and the present growth being comparatively small and light.

EXTRACT FROM THE REPORT OF S. WILLIAMS.

DATED JUNE 13TH, 1908.

[Mr. Williams was employed in the spring of 1908 by the British Columbia Government to locate and run the 52nd parallel of latitude between the Cariboo and Lillooet Districts, and has appended to his report a short treatise on the raising of horses in the Chilcotin District.]

The first townships, 42 Lillooet and 43 Cariboo, lie upon a high timbered ridge between the San Jose River and Chimney Creek. The timber upon this ridge is principally fir varying from 2 to 4 feet diameter. The trees average about fifty and seventy-five to the acre. The wood is very hard and strong and the trees are tall and well-grown in this locality.

Townships 46 Lillooet and 47 Cariboo start at the Springhouse Range and pass through magnificent grazing land with patches of poplar and are watered by numerous lakes. There are several thousand acres of this class of country upon either side of the line; especially to the south, where the open grass country extends for about 5 miles, with numerous wild-hay meadows. Sections 33-34 in these townships pass over a limestone peak, a spur of Pablo's Mountains; then the line descends into a grazing valley between this mountain on the north and the main Springhouse Range to the south. The line at Sections 31-6 drops over the edge of this pass and descends about 1,200 feet to the Fraser River, the township corner being near the base of the main hill. There is good arable land and excellent winter range in sections 36-1 or Townships 48 Lillooet and 49 Cariboo. The Fraser River is crossed a mile north of the bridge. The hill then rises west in a series of steep slopes with benches covered thickly with fine bunch-grass. Sections 34-3 enter the Chilcotin Plateau with numerous valleys and lakes and are knee-deep in grasses of the best quality.

Since entering Chilcotin I have passed four settlers' cabins. None of their land has been surveyed, one settler having an area fenced 2 miles wide. Although this magnificent country is at present devoted principally to stock-raising, the inhabitants merely putting up wild hay for winter feed, I am of opinion that it has a great future as a dairying country. When a class of settlers come in who are willing to do more than work for a month or two in the year at haying there is no reason why a great majority of the cows being supported by this country should not be producing butter. At present there is only one outfit milking cows and they are doing extremely well, making butter of a fine quality, and receive far more orders than they can possibly fill. Hogs do well running at large, and could be fattened with the skim-milk and barley which would do well in all the small valleys which now support a growth of rank grasses and peavine under the large poplars.

The western termination of Townships 46-47, on the steep descent from the Springhouse Range country to the Fraser River, which at this point runs in a valley about 1,200 feet deep, with steep slopes and benches, on several of which water is easily obtained, has some of these benches under cultivation. Many kinds of fruit and vegetables, including apples, corn, and tomatoes, can be raised. Similar benches have fruit and vegetables growing on them in Township 48.

On the west side of the Fraser River, in Townships 48-49, the ground rises in a succession of steep bunch-grass-covered slopes to the Chilcotin Plateau at an elevation of about 2,400 feet above sea-level. This plateau in Townships 48-49-50-51 and 52 is principally open, affording rich feed for cattle for eight months of the year, and for horses for about ten and, frequently, twelve months. There are also large belts and patches of fir timber which is of fair commercial value. The plateau is intersected by small valleys and chains of lakes, and, although the best places for settlement are already occupied, there are many spots now growing willow, aspen, spruce, etc., which might be cleared and cultivated, many of which would grow crops without irrigation.

With the magnificent range land at hand available for so many months of the year, dairying might be carried on to a far larger extent than at present, with horse-raising, which is found profitable, and should become an important industry.

The base-line in Townships 54-55 enters an entirely different country, very hilly and broken, and covered principally with small pine timber of very little value. In many places this timber is burnt off and the ground is gravelly and barren. This continues to Section 32 in Township 56, when the line emerges from the hills and enters an extensive level plain from which small pines have been burned off, leaving very little growing in their place. This plain extends southward about 2 miles to the lava rim-rock overlooking the valley of the Chilcotin River and is bounded on the north by a range of barren hills.

At the commencement of Townships 60-61 the ground begins to fall toward the Chilcotin River and descends sharply over the lava rim-rock into good grazing country in Sections 1-36. Shortly after entering Sections 2-35 the line crosses the east boundary of the Anaham Indian Reserve and continues therein to the bank of the Chilcotin River in Sections 3-34. Observations for latitude showed that the line would cross the Chilko River at a distance of about 15 miles west. There are a number of settlers' locations within the distance as well as valuable land bordering on the river on both sides.

HORSE-RAISING IN CHILCOTIN.

With reference to the subject of horse-raising in Chilcotin referred to in the report of my past season's work, I have much pleasure in furnishing you with the following further information, based upon about fourteen years' residence in Cariboo, a large portion of which time I have spent in the neighbourhood referred to.

I stated in my report that horses can remain upon the ranges for a longer portion of the year than cattle; this statement is based upon the fact that there are large bands of wild horses frequenting the hills and open country on both sides of the Fraser River. These bands are not so numerous as formerly, for the reason that, since the opening of the North-west, horses have greatly increased in value; consequently many of the wild horses have been corralled and sent out of the country.

There are also a number of branded horses which have existed for years, quite independently of man. I have, myself, a horse which I drove for many years, and which I turned out in Chilcotin four years ago, as he was old and badly crippled by ring-bone. In spite of this ailment, which renders pawing for food in deep snow a difficult operation, this horse survived the severe winter of 1906-7, and I was informed last spring he had come through the previous winter in excellent condition.

Mr. Charles Barrett, the packer for the Dominion Telegraph, winters about eighty pack-horses every year in the Chilcotin Range and seldom has any loss. In the case of cattle, the breeding stock almost invariably requires feeding for two or three months in the mildest winter and the beef cattle often require to be fed for a short period.

There are several persons in Chilcotin who own small bands of horses which they practically never feed, and who live on the profit derived from the increase.

The Indian horses, or cayuses, are generally small, being rarely over 14 hands; they are, however, stoutly built and tough, making excellent saddle and pack animals.

A much better class of horse seems to do equally well in the country, and several of the stock-owners have bands of mares of a size suitable for team and ranch work, stage lines, road teaming, etc.—horses well over 15 hands and weighing from 1,200 to 1,400 lb.

Experiments have been made with heavy horses, such as Clydesdales, Shires, and Percherons, but the colts require good feeding in winter, and these horses do not seem so well adapted to the climate as the lighter class.

The Clydesdale crossed with cayuse mares form a hardy and useful animal, although the rough coat and big head give them a rather coarse appearance.

A rancher on the Upper Chilcotin is breeding polo-ponies from cayuse mares by Arab stallions; he has been successful in raising a number of fine colts, although the timbered nature of that part of the country makes it less suitable for horse-raising and corralling; the horses running at large making it a difficult operation.

The feed upon the ranges consists principally of bunch-grass, which is well known for its nutritive qualities for stock, both in summer and winter. There are also in places large patches of alkali grass which horses are fond of and which proves very good early spring feed.

Everywhere in the timber a long, thin, bright-green species of grass grows thickly, which, in the fall, stock will eat, although in the summer they do not care for it.

Wormwood, a small species of perennial sage-brush, affords good feed in the early spring before the grass grows. In most of the swampy places slough-grass grows plentifully and forms good winter rustling. Other grasses and various species of the vetch family also grow abundantly in many places.

To any person wishing to commence horse-raising upon a large scale, I would recommend the purchase of some meadow or irrigated ranch, where hay could be put up for winter feed. About half a ton of hay to the head I think would be ample, and in mild winters this would accumulate and be ready for severe seasons when more is required. Then a considerable tract of Crown land should also be acquired and fenced, and if possible some river-benches for winter feed obtained. The feed upon these, when fenced, and if not overstocked, would rapidly improve.

EXTRACT FROM THE REPORT OF J. F. TEMPLETON.

DATED JANUARY 10TH, 1909.

[Mr. Templeton was employed in 1908 by the British Columbia Government in making surveys on the Chilako River as far as 22 miles west of the Telegraph Trail and southward to Pelican Lake and the Blackwater River.]

The Chilako Valley is rich in meadow and prairie, surrounded by poplar and pine thickets. The district having been swept by fire in recent years, the second growth is of no great size, and clearing, where necessary, is light. Running back from the river-bottom are a series of low benches. To the north the country is greatly undulating in character, covered with a growth of small pine, poplar, and spruce, with good grass throughout. To the southward the country is similar until the foot-hills of the Telegraph Range are reached. These form a low divide between the Chilako River and the Nataniko River, the latter a tributary of the Blackwater.

The bottom lands of Chilako River are particularly rich and deep, having a heavy black soil that should prove very fertile when brought under cultivation.

In the meadows wild hay and peavine grow thick and rank. Scattered clumps of dense willow-brush and poplar-wood, with spruce thickets, cover the greater portion of the lower benches. On the higher land the soil appears to be a light silt, comparatively free from rock, and covered with a fairly open growth of poplar, pine, and small scattered spruce.

From the natural indications the snowfall in the valley is very light. Natives and settlers report the average winter season comparatively easy.

On reaching the western limit of the Chilako River, survey operations were continued to the southward, in the Nataniko River and Pelican Lake country. Here we laid out in sections some of the finest land covered during the season—some large areas of well-watered poplar-flats, with open tracts of low willow and alder brush. This part of the country is particularly level. The soil is deep, with but occasional indications of rock. The remaining country laid out in this Nataniko group is fair land, sandy in nature, with a growth of pine and poplar. The northern portion has many scattered spruce-swamps, needing drainage, the result of innumerable beaver dams. The district has a generous rainfall throughout the season and has streams and lakes in abundance.

In September and October we extended our lines north from the work of last season, on the eastern Chilako River, covering a large level tract of land reaching to the Blackwater River. This low plateau is covered, for the most part, with a light open growth of pine, with some small poplar in scattered clumps. The soil is sandy in nature and light. There is good grazing throughout the entire area. The lower benches along the Blackwater River are fairly open, with a light growth of black pine, some fir thickets, and poplar clumps. The soil is black but very stony. The side-hills of the benches are covered with a thick growth of bunch-grass and offer very fine grazing.

EXTRACT FROM THE REPORT OF H. FRY.

DATED DECEMBER 21ST, 1909.

[Mr. Fry was employed in 1909 by the British Columbia Government in making surveys in the Euechiniko and Nazko Valleys.]

The shores of Batnuni Lake are steep side-hill, the land being fit for grazing only. The valley continues west for about 20 miles, with occasional patches of isolated first-class land.

From here we moved to the Blackwater Valley, and, starting at the south boundary of the work done in 1908, the survey was carried up the Blackwater 3 miles above its confluence with the Nazko, the river being traversed and surveys made continuously. One mile west of the end of our survey on the Blackwater River another large stream comes in from the south-west, the Baezaeko, and in this valley there is a considerable area of good land which should be surveyed.

EXTRACTS FROM THE REPORT OF J. F. TEMPLETON.

DATED DECEMBER 29TH, 1909.

[Mr. Templeton was employed in 1909 by the British Columbia Government in making surveys on the Blackwater River and towards Prince George on the north.]

The soil in the southern portion of this block on the Blackwater River proved similar to that to the west, a light sandy loam entirely free from any trace of rock or gravel. The growth is principally pine and small poplars. There is good grazing land throughout. Along the valley of the Tako River, draining Punchow Lake, there are several sections with good clay bottom land and with a light growth of willow interspersed with thick clumps of spruce timber. To the north-eastward the sections about Punchow Lake are of poor quality, a great deal of gravel showing on the ridges. To the north-westward, following the valley of the creek named Camp Creek, we found some very fine land indeed. The creek-bottom itself is an unbroken stretch of hay meadow, with the benches on either hand of rich clay loam, principally poplar, willow, and small pine growth. There are several ideal locations for the pre-emptor with cattle in Lots 1643, 1644, 1635, 1649, etc.

On completion of this block we moved to the Fraser River, where I laid out several sections of good land. The soil and conditions in these blocks are similar. One, at Fort George Canyon, contains 5,004 acres, and the other, at White's Landing, about 24 miles beyond the canyon, 2,907 acres. In this group the ground gradually rises from the Fraser in a series of benches. As a rule the soil on the immediate banks of the river is very poor in quality, containing a great amount of sand and gravel. On the upper benches, however, a light-brown clay loam is found, with little timber of importance. The country has been recently overrun by fire. Standing dead fir and spruce stubs are everywhere. The undergrowth is principally willow and poplar.

On completing these two small blocks we proceeded to lay out in sections the land between the Chilako and Fraser Rivers in the locality of Beaverley Creek. The soil is similar to that on the Fraser, a light-brown clay loam, rich and deep. Several of the lots 2 miles west of the Fraser are badly cut up with gravel ridges and the soil is of very poor quality. Westward, however, the quality vastly improves. The southern boundary of the Beaverley Creek group is in timber, mostly spruce and balsam. Outside the timber-belt the country is very open, willow and alder brush being the principal growth. There are many desirable locations for the pre-emptor in this block, close as it is to the Grand Trunk Pacific Railway and Fort George.

EXTRACTS FROM THE REPORTS OF A. H. HOLLAND.

DATED DECEMBER 13TH, 1909, AND JANUARY 3RD, 1910.

[Mr. Holland was employed in 1909 by the British Columbia Government in making surveys in the vicinities of Cluculz Lake and Bednesti Lake.]

My surveys cover a large tract of country which has been burned practically clear, leaving only a small percentage of standing timber. Since the fire there has been a splendid growth of wild grass, the natural pasture of that part of the country. The soil is a silt, with a great deal of gravel and rock growing up. It is not very suitable for farm land. The country lying between this survey and the Nechako River is badly broken up by ravines and is covered with a thick growth of pine. I did not survey this area. The country lying to the east is also rough and is covered by a thick growth of green timber of pine and spruce. The soil is generally gravel, with no level country of any size.

In the patch of land covered by the surveys are several small water-holes. The drainage is north-easterly to the Nechako River, entering by a small creek about $1\frac{1}{2}$ miles north-west

from Isle de Pierre Rapids. The stretch of burned-over country seems to follow down the valley of this small creek and there have been some stakings or applications to purchase near its mouth.

The surveys made by me at Bednesti Prairie included 11,940 acres lying on the south and west sides of the Nechako River. Light soil or silt exists throughout this area, lying on a high plateau about 400 feet above the Nechako River. It is covered by a rather thick growth of pine, spruce, and poplar. On the lots lying to the north of the Fort George-Stony Creek Trail there is no running water, but there are a number of small muskeg swamps with water in them. The northern portions of Lots 1750, 1751, 1752, and 1759 and the southern portions of Lots 1753, 1754, and 1768 are considerably broken, being high rolling country covered principally with small poplar and some pine. The soil is silt and it would make good grazing country. The balance of the lots are nearly all level, and through Lots 1760 and 1767 there are one or two small streams of running water. This portion of the land, though more level, is covered with a thick growth of poplar, pine, and spruce. The southern boundaries of Lots 1766 and 1767 lie along the foot of a small mountain which is heavily timbered with pine and spruce, containing some merchantable timber. Little of it lies on the surveyed land. The frontage on the Nechako River rises in small benches and rolling country for half a mile back from the river, where the ground runs back level for some miles.

EXTRACTS FROM THE REPORT OF A. J. CORYELL.

DATED NOVEMBER 14TH, 1910.

[Mr. Coryell was employed in 1910 by the British Columbia Government in making surveys on the Upper Fraser River, commencing at the Grand Canyon and working south.]

The Grand Canyon consists of two rapids known as the upper and lower rapids, connected by an easy stretch of water about a quarter of a mile in length. The upper rapid is a quarter of a mile long and the lower about 1 mile in length, and the total fall in the $1\frac{1}{2}$ miles is 25 feet. From the Grand Canyon to the Clearwater River (now known as Torpy Creek) the average fall is 2 feet per mile, with a channel suitable for light-draught river-steamers, open from April to November 10th this year, but has been known to close on October 16th.

The lower rapids traverse a canyon between limestone hills rising 500 to 700 feet above the river, timbered with spruce, balsam, fir, and cedar where soil exists. The hills on the left bank extend to the head of the lower rapids, where the banks are 50 feet. From this point level benches and swamp lands extend 2 miles south to the foot-hills of the mountain range enclosing the valley on the south, about 5,000 feet in height and apparently terminating at this point. The bench land is broken by a ridge of sandy soil thickly timbered with spruce and balsam extending from Hungary Creek to Slim Creek, also by a ridge traversing Lots 3279 and 3280, and opposite Lot 3283 where the Grand Trunk Pacific traverses the river-bank. The bench land is largely composed of alder and cranberry swamps, the former flooded by many beaver-dams and the latter covered with a mossy growth from 12 to 18 inches deep overlying a bed of decayed vegetation and rotten wood several feet in depth. These swamps represent such an extensive area of Northern British Columbia that it is important to know that they should not be classed as waste lands. Situated as they are from 20 to 100 feet above the Fraser, their drainage is a simple matter; timbered only with a light growth of small scattered pine, the cost of clearing will be a small item, and experience has proved, along the Columbia River in Oregon and at Bellingham Bay, Whatcom County (where such land was once classed as waste), that by drainage and burning the moss once or twice such land has been converted into the most valuable farms in that State and at much less cost than the dry timbered sections.

On the right bank a broken limestone ridge, from 150 to 500 feet in elevation above the river, extends easterly about 5 miles to Toneko Pass, which is traversed by the Grand Trunk Pacific location to avoid the Grand Canyon. From Lot 3244 to Lot 3252 the land is in benches from 20 to 150 feet above the river, well timbered with spruce and balsam, alternating with beaver meadows and swamp lands timbered only with small pine. Here the mountains on the north of Toneko Pass close in to form the valley of the Fraser, and with two prominent peaks at this point, locally known as Mount Ida and Red Mountain, forming the highest point of the divide between Torpy Creek and McGregor River. This range gradually lowers in altitude to the river-benches at the mouth of the Torpy and is well timbered with spruce and balsam to

Red Mountain Creek; with cedar, spruce, and balsam to Lot 3269; and with fir, spruce, and balsam to the Torpy from this lot.

From the canyon to the Torpy, with the exception of the cranberry marshes, the bench land and mountain-slopes are covered with a forest of spruce, balsam, fir, and cedar. A large part of this is suitable for pulp-wood, and probably 100,000 acres, within and without the reserve, are held under timber leases averaging 12,000 to 20,000 feet B.M. to the acre of milling-timber. The 122,880 acres in this reserve should give a cut of 730,000,000 feet of spruce, cedar, balsam, and fir lumber.

From the canyon to the Little Smoky River (now known as Morkill River) is the home of the moose, and the Government have done wisely in placing a game reserve between the two Fraser River forks to protect this game. On the Torpy Range grizzly bear are plentiful and black bear through the bench lands, where they can feast on the raspberries, teaberries, huckleberries, blueberries, low-bush and high-bush cranberries found throughout this valley. Beaver are too plentiful for the comfort of the actual settler when he invades this district, and marten have been trapped for years. Three trappers and several Indians were in the district when the survey was completed. Caribou range on the hills near Slim Creek and Dome Creek. Of feathered game, wild geese and ducks breed in this district, but are not plentiful. Ptarmigan, willow-grouse, and spruce-partridges were fairly plentiful.

From June 16th to July 15th it rained every day or night, and often both day and night, and when we returned to the Grand Canyon in October it was still raining. From July 15th to October we had from one to two days of rainfall per week, and timber-cruisers, who had been in this district for the past three years, represented that this season was unusually dry. From the upper limit of the timber-belt, about 80 miles below Tete Jaune Cache to that point, the timber has been burnt twice and a growth of small poplar has replaced it. This section is found to have less rainfall than the timbered section.

The Grand Canyon is undoubtedly the gateway to a milder climate than is found between Bulkley Valley and this portion of the Fraser River. Timber-cruisers and trappers, who have wintered in this valley give the snowfall along the river to be from 10 inches to 2 feet and the temperature not less than 25° warmer than the Fort George and Giscome Portage Districts.

Limestone outcrops from the canyon to Red Mountain, where it forms an apparent contact with the Bow River series of quartzites, schists, etc., mentioned in the Dominion Geological Report. On Mount Ida a copper vein assaying \$26 per ton and on Red Mountain a galena-outcrop assaying \$54 per ton in lead and silver values have been located. This neighbourhood may develop a mining camp, but little work has been done up to date. With the above exception, the geology of the country does not seem to offer much inducement to the prospector. Extensive beds of good brick-clay were noted along the river.

EXTRACT FROM THE REPORT OF A. W. HARVEY.

DATED NOVEMBER 17TH, 1910.

[Mr. Harvey was employed in 1910 by the British Columbia Government in making surveys on the Upper Fraser River between the mouth of the McGregor River and the Grand Canyon.]

The section of the Fraser which was covered by the season's work extends from the Grand Canyon in a north-westerly direction to the place where the Big Salmon or North Fork (now known as the McGregor River) joins the main river. Its valley occupies the line of downward folding between the great arching fold of the Rocky Mountains and the lesser one of the Gold Range. The foot-hills of the Rockies, which are usually in view along the river, stand well back from it at the lower end, where they are separated from it by a series of rolling uplands 10 or 12 miles wide. Above the Bowron River junction, however, they draw in close; and near the Grand Canyon they are found rising direct from the alluvial plain in a steady slope, attaining a height of 3,000 feet above it in the space of a few miles.

The group of rounded hills which form the south-western boundary of this section of the Fraser Valley is called the "Cariboo Range" on some of the Dominion Government maps, though the appropriateness of the name is questioned locally. It is the northern extension of the belt of mountain ground to which the Selkirks belong. This chain of hills is farther from the river than the corresponding one to the north-east, which has been already mentioned; but it, too,

presses closer on the valley towards the Grand Canyon than lower down. The result is that, while the valley is broad and open throughout the greater part of its course, the area which is available for settlement is seriously reduced as the canyon is approached.

Rocks belonging to the older formations compose the hill-ranges on both sides of the Fraser Valley. These are chiefly sedimentary. Solid rock is not, however, of frequent occurrence in the area which has been covered by the season's work. The rocky walls of the Grand Canyon are mainly composed of hard shale, though it is found cutting through both limestone and sandstone. For many miles below the canyon the valley is filled in with a mass of alluvial material several miles wide and some hundreds of feet in depth. Its surface presents the usual flood-plain, which varies between 5 and 15 feet above high water, and which is overlooked by broad, nearly level terraces that extend back to the hills of solid rock on the north-east and south-west. The material of the flood-plain is usually a fine sandy loam; but numerous patches of brick-clay have been noticed, which may prove hereafter of industrial value. The height of the terraces increases with their distances from the river, but does not appear to exceed 250 feet, while by far the greatest area of the terrace lands ranges between 25 and 60 feet above high water. The subsoil of these lands is coarser than that of the flood-plain, gravel of moderate fineness being the usual material. Occasional hills and ridges of limestone rock are found projecting through the layers of sand and gravel to a height of from 100 to 300 feet; but otherwise there is not much variety in the contour of the surface. The terraces are level or very gently sloping, except along their edges where they overlook the lower grounds. Bordering slopes up to 15° are common, and steep-sided gullies are nearly always found where the drainage from the terrace platforms delivers on to the flood-plain.

The flood-plain reaches its greatest width on the McGregor and Bowron Rivers above their junctions with the Fraser, and on the main river between Island Lot 3105 and the Grand Canyon. The most convenient division of its surface is into willow-swamps, open meadows, and lightly timbered swamps. The willow-swamps are widest along the McGregor River, where they extend back for a quarter of a mile or more from the water's edge. The main river is almost everywhere bordered by a belt of willows backed by poplars or cottonwoods; but this is never very wide south of the parallel of Otter Lake. The willows give place to alders in the bottoms along the tributary creeks. The open meadows vary from grassy patches a few chains across to tracts of 100 acres or more, shut in by spruce forest and commonly sprinkled with hardback-bushes. The larger meadows are nearly always crossed by winding sloughs. These are the favourite haunts of beavers; and what with the prevailing flatness of the surface and the interference of their dams with the natural drainage, the meadows are generally too wet for anything but the swamp-grass to flourish. Their drainage will not, however, be a task of any great difficulty. Muskegs, though fairly numerous, are nowhere of any size below the Bowron River junction. The jack-pine swamps do not as a rule show much water, unless during high water in the Fraser. The trees in them average about 5 inches. Pools of water and alder-brush are nearly always noticed in the spruce-swamps.

The terrace uplands are everywhere covered with thrifty spruce and balsam. The undergrowth is usually devil's-club, and this is never very dense. Firs, cedars, and hemlocks are rare and confined to places of considerable height near the enclosing hills. Birches are found in increasing numbers south of the parallel of Hansard Lake, and they form more than 10 per cent. of the forest in some of the lots towards the Grand Canyon.

Not much of the timber in the district surveyed is large enough for the higher grades of lumber, though there is a decided increase in the size towards the hills. Sixteen-inch spruce and 10-inch balsam would probably be the average of what has been seen. The abundance of spruce is, however, so marked as to suggest very strongly the fitness of the district for the manufacture of pulp. The balsams would probably add a quarter to the pulp-producing material.

The limestone hills have flat or gently rounded summits, but are nearly always bordered by steep bluffs. The soil on them is thin and poor; and although they carry a fair growth of timber, it is scrubby in tendency.

The block, whose opposite corners are Lots 3035 and 3057, is a typical area of terrace upland, although the river is bordered by an alluvial flat of moderate width overgrown with willows, and high ground composed of sandstone and quartz rock is found at the south-west corner.

A belt of open meadows several miles in length extends east from Hansard Lake to the other side of the Fraser Valley. They are covered with a rank growth of swamp-grass, varied by occasional muskegs and small lakes with low swampy shores. The land in this belt is in many

places fit for immediate cultivation; while a still larger area only awaits drainage. The ground rises to the south of this belt of meadows on the west side of the Fraser, forming a limestone ridge nearly 500 feet high.

The Bowron River has an extremely winding course for several miles above the junction. The lots which it crosses contain wide areas of rich alluvial land, which is largely covered with willow-brush.

The most marked feature of the district above the Bowron River junction on the main river is the great extension of open meadows and timbered swamps. The grade of the Fraser is flatter here than lower down; and the flood-plain is consequently much wider, approaching 3 miles in some places. The ground on the left bank which would be enclosed by a line joining Lot 3109 S.W. to Lot 3121 S.W. must be looked upon as a single meadow; for although its surface presents cranberry-marsh and timbered swamp as well as swampy meadow, drainage would bring them all into the same condition.

The terrace uplands which lie to the north-west of the great meadow on the other side of the river do not differ in any essential respect from those lower down, the increase in birches being probably due to climatic causes. The hills rise behind these uplands at no great distance.

A limestone ridge more than 300 feet high extends westward from a high bluff on the Fraser at Lot 3118 S.E. and forms, with its fringe of terrace lands, the southern boundary of the great meadow. A tract of low flat country, largely jack-pine swamp, lies between the Grand Canyon and the eastern boundary of the meadow on the right bank of the river. This is crossed by the loops of Moxley Creek and is separated from the Fraser by a ridge of terrace lands, on which the proportion of poplar runs very high.

The climate of the district was mild and agreeable during the working season. There were very few oppressively hot days, owing doubtless to the circumstances that the Fraser is largely fed by the melting of snow-fields. There were showery forenoons about once a fortnight; but the work was scarcely interfered with by rain until the beginning of September, when there was a spell of wet weather which lasted for about ten days, though even then it did not rain heavily two days in succession. Snow fell on summits above 3,000 feet but did not remain. It did not come down to 2,000 feet or show any sign of permanence till the middle of October. The summer frosts which are so much complained of farther down the river were scarcely noticed. On the whole the climate seems to be one to suit the farmer, both as regards rainfall and temperature, during the growing months of the year.

EXTRACT FROM THE REPORT OF M. W. HEWETT.

DATED NOVEMBER 20TH, 1910.

[Mr. Hewett was employed in 1910 by the British Columbia Government in making surveys on the Upper Fraser River in the vicinity of the Yellowhead Pass.]

From the summit of the Yellowhead Pass at the head of Moose Lake for a distance of approximately 19 miles the river flows in a valley very little over half a mile wide, bounded on either side by low foot-hills rising to high peaks behind. The southern hillside is, for the most part, well timbered with spruce and balsam, while the north side of the river, owing probably to the fact that the old trail through the pass followed that side, is almost uniformly burnt and covered with a second growth of white poplar and jack-pine.

Good outcrops of marble were reported in the hills to the east of Moose Lake.

The survey was commenced at the foot of Moose Lake, on the north side of the river, the south side having no flats of greater extent than 50 acres. Lot 5661, which fronts on Moose Lake, should, in view of this fact and of the extreme beauty of this part of the valley, become in course of time the site of a summer resort of considerable proportions. It is the only ground available for this purpose, as along the rest of the shore-line the hills slope steeply to the lake.

On Lots 5662 to 5666 hay and fodder crops, vegetables and small fruits can be raised. Vegetables and small fruits grow in great abundance. The river-front soil is mostly a deep clay silt, the back of the lots being stony or gravelly. During the three months spent in the vicinity there was practically no rain and considerable summer frost; the previous summer was, however, it was stated, much wetter, and there were then no summer frosts. The winter at Moose Lake is said to be severe, with maximum snowfall of about 4 feet.

This section has originally been heavily timbered with spruce and jack-pine up to 2 feet in diameter, with some fir on the lower mountain-slopes. All of this is now killed by fire, the north side being an older and cleaner burn than the south side. The ground could be cleared at a very slight expense.

The adjoining mountains are schist, with, apparently, some marble. They are heavily stained in places with iron oxide.

The river for 2 miles below Moose Lake is navigable for canoes. The next 8 miles is very rapid, the bed being filled with large boulders. The fall is estimated to be nearly 70 feet to the mile. The banks are from 70 to 100 feet high, with some small flats along the river. The volume in July was estimated to be from 50,000 to 70,000 cubic feet per minute. At the end of October it was probably half that.

There appeared to be no game in the valley, with the exception of willow-grouse, which are fairly numerous. One black bear was seen. Good trout were taken both from Moose Lake and from the river, but they do not rise to a fly at all freely, owing probably to the muddy nature of the water.

Below Lot 5666 the valley narrows abruptly, the mountains coming down to the river for about 5 miles. From this point a flat opens out about 2 miles square, lying on both sides of the river, with the Grand Fork River, draining the slopes of Mount Robson, flowing through the northerly part of it.

In connection with the suitability for cultivation, I had a talk with Mr. Harvey McKenzie, who has a pre-emption at the foot of Mount Robson, and got from him the following information:—

Depth of snow last winter: At Grand Fork, 4 feet; at Mile 41, 2 feet; at Tete Jaune Cache, 18 inches. Minimum cold was 20° F. for about three days in January. Snow lay on the ground from December 15th to April 15th. Flurries of snow are liable to fall from November 1st, but do not lie.

If this information is correct, it seems to me that this valley should be eminently adapted for fruit-growing, as the winter is very little, if any, more severe than at Kamloops. Mr. McKenzie also showed me good lettuce and turnips raised here.

The soil on the north side is mostly a sandy silt, with considerable gravel; and on the south side a bench extending back to the foot of the mountain seemed to be very good, being clay silt with some open swamp land. This portion has also been heavily timbered. With the exception of a small belt of good timber under the southern mountain, it is all burnt, and is growing up again with jack-pine and poplar. A considerable portion of the remaining belt of green timber is cedar, most of which unfortunately, is so hollow as to be almost useless.

Below the mouth of the Grand Fork the valley again narrows considerably, but a narrow strip of excellent land exists here on both sides of the river. On Lot 5679 a small patch of clear land, covered with bunch-grass, occurs, surrounded by green timber. This patch, which had been burned over, was a favourite camping-spot on the old trail. The character of the mountains continues the same, with a good deal of slate occurring in the formation.

The rapids end about a mile above the mouth of the Grand Fork, and the river for 3 miles is moderately swift water, with a gravel bottom. The rapids begin again about the south end of Lot 5679, however, with much less fall than above. About a mile below the mouth of Grand Fork a stream known as the Swift Current River empties into the Fraser. This has an estimated fall of 100 feet to the mile, and an estimated volume of 3,000 cubic feet per minute in August and 1,000 cubic feet per minute at the end of October. The flats end below Lot 5681.

On the river the rapids end about a mile from the south-east corner of Lot 886, having an estimated fall of 200 feet in 4 miles. This portion consists of a series of steep boulder rapids, with stretches of smoother water intervening. There is one fall of 14 feet at the head of a short rock canyon.

The mountains on the south side end in a long sloping point which separates the Fraser Valley from that of the McLennan River. In the valley of this river Lots 5682 to 5697 were surveyed, in continuation of previous surveys at Tete Jaune Cache and connecting with another group of prior surveys about 5 miles up the valley.

The valley of the McLennan River, which runs in a south-easterly direction, has a width of at least 3 miles up to the divide of the Canoe River. It consists of a series of benches having an almost imperceptible rise to the south-east and an approximate elevation of 200 feet above

the river. The river through this portion of its valley runs close to the foot of the western mountain range.

The character of the soil is sandy, with numerous open swamps of considerable size, dry at the time of survey, interspersed. The subsoil, as evidenced by cuts on the Grand Trunk Pacific and by slides in the steep bank of the river, is clay. In several places under the eastern range this clay appears on the surface, and in others, as evidenced by an abundant growth of water-loving plants and shrubs, cannot be far below it.

In one place, in a perfectly dry flat, covered with a growth of jack-pine, poplar, alder, and willow, a test-pit was sunk and water found in sand at a depth of 3 feet. In the dry swamps there was uniformly a foot of black peaty loam, and, under that, water in sand. Along the steep banks of the river numerous spring creeks are found.

This land has originally been covered by a growth of small jack-pine and white poplar, a good deal of which still remains, the balance being burnt and mostly wind-fallen. Clearing would be easy. The lower hillsides appear to be principally boulder-clay and are covered on the east side with a good growth of timber, principally fir, poplar, and jack-pine. The western hillside is burnt.

The mountain range to the west is high, with numerous sharp conical peaks.

The bed of the McLennan River is absolutely dazzling in places with mica-flakes, while in others it is pink with small garnet crystals. At the time of survey, October, 1911, the water was clear and shallow, there being barely depth to float loaded Peterborough canoes. The river-flats are small and thickly covered with spruce, poplar, and willow. The channel is extremely tortuous and the fall slight. A few families of beaver were found along the river and small tributaries. Willow-grouse were extremely plentiful, and a few fool-hen were found.

The elevation of this country, deduced from Grand Trunk Pacific levels, is about 2,600 feet above sea-level. Snowfall is said not to exceed 20 inches, and 20° below zero, for short periods, to be the minimum cold. In many places the river was frozen over on October 28th.

EXTRACTS FROM THE REPORT OF HERMON & BURWELL.

DATED NOVEMBER, 1910.

[Messrs. Hermon & Burwell were employed in 1910 by the British Columbia Government to make an exploration of the Parsnip and Peace River Valleys.]

Giscome Portage, latitude 54° 15', runs in a westerly direction for about 7 miles from the Fraser River to Summit Lake; elevation at Fraser River 2,020 feet above sea-level; elevation at Summit Lake 2,400 feet. Messrs. Hubble and Seaback have a small ranch and trading-store here where the soil is fairly good, producing good vegetables and a small crop of oats, but the seasons seem short and they are bothered with summer frosts. The country towards Summit Lake is covered with small jack-pine and some small spruce; the soil is light and sandy.

Summit Lake, elevation 2,400 feet, latitude 54° 20', is about 3½ miles wide from east to west and almost 4 miles long, and is the chief source of the Crooked River. The country surrounding it is undulating and covered with scrub spruce.

The Crooked River (rightly named) averages about 25 feet in width, and for its whole length is crossed by shallow sand-bars, over which the water runs swiftly. Over most of these bars we had to get out into the water and haul our canoes across. In between are holes and slack water from 6 to 15 feet deep. We might mention that the last two weeks in May are considered by the Indians the best time of year for travelling on this river.

The country on the east side is a wild undulating country covered with scrub spruce averaging about 8 inches, some balsam and cottonwood and small jack-pine and alder.

There are jack-pine flats in places covered with a light sandy soil, and along the river-banks are narrow strips of country where the soil is better, growing grass in places, but mostly covered with alder and cottonwood. These strips vary from 50 to 200 feet in width.

About 34 miles from Summit Lake the Crooked River widens out into Davie or McKay Lake, elevation 2,320 feet above sea-level. The lake is about 4 miles long by 1½ miles wide, the country keeping much the same in character, though the jack-pine is larger and would be useful for tie timber if a railway was constructing, there not being enough of it to make it worth while to haul it out.

An unnamed creek empties into Crooked River about 1 mile below the outlet of Davie Lake. It is about 20 feet wide and contained about 20 second-feet of water at the time of observations. It is the largest creek emptying into the Crooked River and we followed it up for some distance, but the land that it drains does not differ in character from the rest of the country.

About 12 miles farther down, at Red Rock, the river widens out into a shallow slough called Long Lake. From Red Rock an Indian trail running in a north-easterly direction for a distance of $7\frac{1}{2}$ miles leads to Tacheeda Lakes, which are situated on the divide between the Crooked and the Parsnip Valleys at an elevation of 2,800 feet above sea-level. The country is much the same; in fact, we may state here that it is characteristically the same from Summit Lake to Fort McLeod.

These two lakes are fine clear-water lakes, surrounded by hills which are well timbered. The westerly lake drains down into the valley of the Crooked River at high water; the other down a shallow river about 5 miles in length, emptying into the Parsnip River about 100 miles from its headwaters. The timber was smaller about here; soil and country the same. The Parsnip is about 200 feet wide at this point and is about 6 miles west of the Rocky Mountains.

McLeod Lake, elevation 2,250 feet, is about 17 miles in length by 1 mile in width. The country surrounding the south end of it is low and marshy for a couple of miles back, when the hills commence and are considerably higher than those already encountered, the highest about 500 feet above the lake. The rock formation changes here from a diorite to a limestone formation, which formation continues until you reach the Peace River.

We cruised the country carefully on the east side of the lake, but found no extent of meadow or open land, except about 40 acres opposite the north end of the lake.

We camped at Fort McLeod on July 20th, elevation 2,250 feet, latitude $35^{\circ} 45'$, distant about 87 miles from Summit Lake. This is the oldest Hudson's Bay post, having been established by the North West Trading Company and taken over by the Hudson's Bay Company in 1820. There are about ninety-eight Indians left of the Sicannie, who hunt and trade here, and they are dying off fast. They are meat-eating and hunt all year around. Consequently the big game is pretty well cleaned out of this vast country. The beaver and small fur-bearing animals are also getting scarce for the same reason. The streams and lakes, however, abound with trout and chub, which prevents them from actual starvation. From here we got our first view of the Rocky Mountains, showing up on the east side of the Parsnip River.

The Hudson's Bay factor grows some very good vegetables at the fort, although they were small this year from frequent frost. From Lake McLeod to the Parsnip River there is a swift little river called the Pack. It is about 17 miles long and at certain times of the year dangerous for canoes on account of the numerous boulders and swift water. The river averages about 100 feet in width, except for about 4 miles, half-way down, where it widens out into what is known as Tudyah Lakes.

The hills are from 500 to 1,000 feet high and parallel the river within a mile of its banks. For about 12 miles the country then becomes flatter and at the junction of the Pack and Parsnip on the south-easterly side there is about 800 acres of good bottom land covered with large cottonwood and alder.

There is a small chain of lakes between the Parsnip and Pack Rivers. From there up, the high hills commence coming in from McLeod Lake and are burnt over and destitute of timber. The east side is chiefly jack-pine flats and sandy soil for about 20 miles in width from the Parsnip to the Rocky Mountains.

The Misinchinka River has its source in the Rockies at what is known as the Pine River Pass, and runs in a westerly direction for about 20 miles, where it empties into the Parsnip about 185 miles from its source. The creek averages about 30 feet in width and contained about 25 second-feet of water in August. We panned some flour gold from this creek, but it is too fine and in too small quantities to be of any value. The old Hudson's Bay Trail, running from Stuart Lake to Fort McLeod; thence to Tudyah Lake, to Parsnip River; thence through the Pine Pass on to Hudson Hope, crosses the Parsnip $1\frac{1}{4}$ miles above the Misinchinka.

The Parsnip River averages about 150 yards in width and runs about 4 miles an hour. There are so many deep holes and narrow shallow bars that it was impossible to measure it at all accurately. The river runs in a northerly direction.

The Finlay River appears to be about the size of the Parsnip, though not as swift. The Finlay Rapids are practically the headwaters of the Peace River, latitude $56^{\circ} 45'$, elevation 2,000 feet above sea-level.

They are very swift and deep, with large boulders and rocky outcroppings through them. They are about a quarter of a mile long by 400 feet wide and have a drop of 12 feet, running in a north-easterly direction. The flat country terminates here on the east side as far as the Parsnip and Peace Rivers are concerned, the Rocky Mountains forming the banks of the Peace River for about 20 miles.

We found that the valley is practically all bench land extending from the Pack and Parsnip Rivers, where it is about 20 miles wide. From the Parsnip to the Rocky Mountains it gradually narrows down to about 5 miles at the Nation River and remains that width until the Peace is reached. There are a few high benches and ridges along the river, but they are chiefly jack-pine flats with a sandy soil.

The seasons, according to the Hudson's Bay records, are rather severe around McLeod and the Parsnip Valley, McLeod Lake freezing up about November 1st and the ice staying until the beginning of May, the average snowfall during that time being about 5 feet. The summer frosts occur frequently. This summer the leaves began to change and the top of the Hudson's Bay potatoes were frozen off about the middle of August.

The summer weather while we were there was ideal, the nights being cool, the days clear and bright. The hottest days were in the first week in July, when the thermometer registered up to 82° in the shade for three days.

The coldest night was on August 22nd at the Finlay Rapids, when we had 10° of frost in the valley, with fresh snow on the mountain-tops, lasting for two or three days. The average temperature from June 20th to July 1st was 35° at night and 70° in the daytime, including four nights when we had frost, the coldest being 5° on the night of June 25th.

In July the average nightly temperature was 40°, the daily temperature being 73°, there being three nights when there was frost between the 1st and 8th, 4° on July 1st being the coldest. In August 40° was the average nightly temperature, four nights of frost after the 12th, the coldest being 10° on the 23rd. The average in September was 35°, with frost during twelve nights, the coldest night being on the 11th, with 10° of frost, 63° the average in the daytime.

The country, especially the Crooked River, would be a paradise for anglers, the waters teeming with trout, which are very gamy, noticeably the rainbow variety in the Crooked River, which will rise to a fly as quickly as one can be cast. They are not large, but average about 1½ lb. in weight. The char go much larger but are not so gamy, neither are the grayling (or Arctic trout, as they are called), which are numerous in the Parsnip River and are excellent eating. They will also take a fly.

There are quite a few bears of the grizzly, silver tip, black and brown species to be had for any one who understands hunting. The moose, caribou, and deer are scarce at present, but as the young alder and willow grow up in the burnt country, doubtless they will come in from the territory along the Parsnip River, where they are reported as numerous at present.

There are one or two gold-bearing quartz ledges on the Pine River Pass; also some coal-seams, which are all staked. There are also seams of lignite to be seen throughout the district and plenty of float of the same character, but they are of no value. There is a good quartz ledge reported on Wicket Creek, about 20 miles down the Peace, but we did not get down to see it. We panned most of the streams and creeks, but got nothing except in the Misinchinka, where the gold was too fine to be of any value.

Finally, in summing up the country explored, we may state that the general character of the soil is of a light sandy description, with a gravel subsoil. Along the rivers it is richer, being more of a sandy loam, in some places 2 feet deep, with a gravel subsoil.

The average width of the Crooked River Valley on the east side is 7 miles; of Pack River Valley, about 2½ miles; and of Parsnip Valley, about 12 miles.

The average elevation of the country explored is about 2,200 feet above sea-level. The country along the Crooked River is wild undulating forest country; in the Parsnip Valley it is flat benches.

The timber is chiefly spruce, averaging about 8 inches; jack-pine, about 10 inches; balsam, about 10 inches; white birch; an occasional fir is seen, while cottonwood, alder, willow, and poplar are very thick, especially along the banks of the rivers, the cottonwood growing from 30 to 36 inches, and these trees are the ones the Indians use for making their canoes.

EXTRACT FROM THE REPORT OF J. F. TEMPLETON.

DATED DECEMBER 6TH, 1910.

[Mr. Templeton was employed in 1910 by the British Columbia Government in making a survey in the valley of the Salmon River.]

The Salmon River Valley was found to be particularly even and regular in character, being in gently rolling benches gradually rising from the Little Salmon. The river itself is in rather a deep bottom, about 100 or 150 feet below the average bench-level. A great portion of the surveyed area has been burned over and is very open in character. Where the country is untouched by fire the natural growth consists of poplar, pine, spruce, and balsam of varying size and density.

The soil is of a rich brown clay loam for the most part, with gravel showing on the ridges and hill-tops. It is apparently the same brown soil that is seen along the upper benches of the Fraser River in Cariboo District.

Throughout the month of June we experienced a generous rainfall, with July and August particularly dry.

EXTRACTS FROM THE REPORTS OF H. FRY.

DATED DECEMBER 7TH, 1910, AND FEBRUARY 28TH, 1911.

[Mr. Fry was employed in 1910 by the British Columbia Government in making surveys in the vicinities of the Nazko River and Temapho Lake (formerly known as Sucker Lake).]

Commencing at the south-east corner of Pre-emption No. 700, Cariboo District, which is situated on a stream confluent to the Nazko River, an area of 15,520 acres was surveyed. The land comprises sand and gravel benches growing pine and poplar and large grass meadows made by beaver, which at some time must have been very numerous but are now nearly extinct. The locality is suitable for dairy-farming or stock-raising. The flow of water in the main stream, named Snake Creek, was on August 1st 80 cubic feet per second. The mean elevation of the valley above sea-level is 2,800 feet by barometer.

After surveying all the available land in this locality camp was moved to the Nazko River, and work commenced where the Clisbako River comes into the Nazko from the west. The valley is narrow, averaging a mile in width. The side-hills are open, covered with bunch-grass and peavine. A considerable portion of the land has been staked and applied for. The area surveyed was 5,760 acres, consisting of alluvial flat, sand and gravel benches, and bunch-grass side-hill. The flow of water in the Nazko River below the confluence of the Clisbako River was on August 20th 355 cubic feet per second, the latter river contributing half that quantity. Above the canyon the valley narrows in to be almost a ravine and what few alluvial flats there are have been staked. No survey was made.

We then moved camp 19 miles in a south-westerly direction, traversing a trail leading from the Nazko River to Alexis Creek, and commenced the survey of a large valley or basin surrounded by hills, consisting of gravel and rock benches growing pine and poplar, open grass meadows, and beaver-swamps. Three small streams confluent to the Nazko River were also explored.

On many of the meadows, at the present time without drainage or improvement, mowing-machines can be used to cut hay during the months of August and September, and by clearing out old beaver-dams and doing a minimum amount of ditching the land can be cultivated and crops taken off much earlier in the year. The timber is of little value, fires having devastated a large area, leaving not more than is necessary for fuel and fencing.

The watershed is easterly. The distance between the land surveyed and the Nazko River is about 4 miles, the country being the same formation as that surveyed.

On closing the work the party came out via Alexis Creek Trail. Numerous meadows were passed, which are not surveyed and on which hay aggregating over 200 tons has been cut and stacked by Indians this season. These Indians informed me that they drive in horses and cattle from the Chilcotin Valley to winter.

Near Temapho Lake there are large meadows with pine ridges alternating lying in a southerly direction. The soil is of a sandy nature and, with the exception of the meadows,

would require irrigation to be most available for agricultural purposes. There is no merchantable timber upon the area surveyed. All the timber is jack-pine, with a very little spruce, averaging 2 to 7 inches diameter, the exception being 8 inches diameter. The water in the main creeks and lakes is good for domestic purposes.

From Temapho Lake, looking west from the east end, about 70,000 acres of meadow land and pine ridges lie, similar ground to that covered last season. On this ground cattle-ranchers, or Indians in their employ, are cutting hay. If surveyed and leased, this land would considerably augment the revenue from this portion of the country.

EXTRACT FROM THE REPORT OF A. H. HOLLAND.

DATED DECEMBER 19TH, 1910.

[Mr. Holland was employed in 1910 by the British Columbia Government in making surveys on the Fraser River near the mouth of the McGregor River.]

The land surveyed consists chiefly of low benches covered with cottonwood, spruce, and balsam of little or no merchantable value. The soil is good, being a silt-deposit.

On Lot 2877 there are already two pre-emptors, who during the last season broke a little ground and raised some garden-stuff.

Since my surveys one or more records have been applied for along here, and I believe that very shortly the balance of this land will be taken up and put under cultivation. The land to the west of these surveys runs as far as the old surveys of 1906, is rough, and covered by a fairly heavy growth of spruce. I believe there are two or three timber licences applied for on this section, and do not consider there is enough agricultural land to make a survey actually necessary outside of the traverse connections which I have already made.

EXTRACT FROM THE REPORT OF T. H. TAYLOR.

DATED DECEMBER 28TH, 1910.

[Mr. Taylor was employed in 1910 by the British Columbia Government in making an exploration of the Parsnip River and the McGregor River (formerly known as the North Fork of the Fraser).]

We left Giscome Landing for Summit Lake on June 21st, across the portage which runs westerly for about 7 or 8 miles. Summit Lake, latitude $54^{\circ} 20'$, elevation 2,475 feet, which is the source of the Crooked River, is about $3\frac{1}{2}$ or 4 miles wide and about 4 miles long. Several small islands are scattered about the north end of it. The surrounding country is generally hilly, thickly timbered with spruce, fir, and jack-pine, with sandy and gravelly soil.

After about 4 miles of paddling across the lake we entered the head of the Crooked River. Here it is hardly more than 20 feet wide and about 1 foot in depth.

About a mile to the south-west a small mountain-peak called No. 1 Tea Pot Mountain forms a splendid landmark. The general course of the river is about north, averaging about 25 or 30 feet in width. Along the bank, extending back only for about 5 or 10 chains, are strips of spruce, jack-pine, poplar, and willow flats, where the soil, except in the jack-pine, is suitable for agricultural purposes.

The country back of this is hilly and timbered with spruce and jack-pine. Soil is sandy and gravelly. About 22 miles down, the river makes a big bend; going in from here about 3 miles we found a lake about 2 miles long by $\frac{3}{4}$ mile wide, which I named Dominion Lake, it being Dominion Day, July 1st, when we came on it, and another smaller one about a mile north. From Dominion Lake we could see another mountain-peak similar in shape to Tea Pot No. 1, about 5 miles south, which we called Tea Pot No. 2. The Little Salmon River flows the other side of it. The country and soil are practically the same as before.

For about 6 miles below here the river runs very swift over shallow rapids through a rocky spruce, poplar, and jack-pine country, when it widens through a willow-flat and flows for about 9 miles, practically dead-water, about 10 to 15 feet deep, into Davie Lake. This lake, about 5 miles long by 2 in width, is about 35 miles from Summit Lake along the course of the river. Observations here showed latitude $54^{\circ} 31' 41''$, elevation 2,425 feet.

A low range of hills forming the watershed between the Little Salmon and Crooked Rivers slopes up from here for 5 or 6 miles to the summit, 700 feet above the lake, timbered with some fairly good spruce and fir from 10 to 15 inches, some birch and jack-pine, with sandy soil.

From Davie Lake to Long Lake, about 6 miles, the river continues practically dead-water, 10 to 15 feet deep, with exception of a few rapids, through willow-bottom land, which extends about 20 to 30 chains back to foot of spruce ridges. From a high bluff at this place we could see Davie Lake and No. 2 Tea Pot, bearing about south. The surrounding country here for 12 or 15 miles back to watershed is hilly, spruce and some scattered birch and poplar, soil sandy and gravelly.

From here to Kerry Lake, about 2 miles, spruce ridges follow along close to river, and just at the north end of Kerry Lake, which is about 5 miles long by about 2 miles wide, bend away from river and run about parallel 4 or 5 miles back. A spruce-flat broken by strips of willow and jack-pine extends for about 10 miles down-stream. The river along here now varies from 5 to 8 chains in width and is practically dead-water for about 7 miles, through a spruce-flat which extends to foot of hills, some fairly good land for agricultural purposes, where it narrows to about 2 chains and runs swift practically all the way to Lake McLeod, about 6 miles, through scattered willow, spruce, and jack-pine. Land is poor except through willow bottom.

About 3 miles south of Lake McLeod the hills close in to the river again and continue along lake. Timber here looks good for ties and lumber. Entering McLeod Lake, a long point about 2 miles from the mouth of the Crooked River shuts off the view of the lake, but rounding this a small island is seen about 4 miles ahead. The hills here run back slightly, giving place to about 20 or 30 chains of spruce-bottom land.

The post of Fort McLeod, established in 1804, is in charge of Mr. Thomas Hammett, who has been stationed there for about eight years. He informed us, regarding the winter, that the average snowfall was about 5 feet, the lake freezing over about November 1st and breaking up about beginning of May. He has a small garden and grows some very fine vegetables. The Indian village, having a population of ninety-eight, forty-five men and women and fifty-three children, lies next to the post and just north of the McLeod River (formerly known as Long Lake River). The men usually trap on the Parsnip River in the fall and winter and fish during summer.

McLeod River, the first of any size flowing in on the left, is about 25 feet wide by about 2 feet deep at the mouth. I went about 6 miles south-west from here to Warhorse Lake, and from there, extending for about 15 miles, between the range along the lake and a parallel one about 5 or 6 miles west, is a strip of good rolling poplar land about 2 miles in width. About 2 miles south of the post is a marshy spruce and willow flat containing about 2,000 acres. The ridge runs back from the lake here and continues along from 2 to 3 miles back, when it closes in to the Pack River again at Tudyah Lake, about 5 miles below Fort McLeod. Extending westerly from the end of the lake for about $2\frac{1}{2}$ to 3 miles to the ridge is a cottonwood and spruce flat, and extending northerly for about 5 miles along the Pack River to Tudyah Lake about 6,000 acres fairly good land.

West of this country is about same as before. Game along the Crooked River is not very plentiful, black bear being about the only animal left. For the fisherman the river is a veritable paradise, as the rainbow and Dolly Varden trout, weighing from $\frac{1}{2}$ to 2 lb., can be taken with a fly almost as fast as it can be thrown on the water.

After leaving Fort McLeod by the Pack River, which is very swift and about 80 to 100 feet wide, with shallow rapids, about 5 miles down it expands into Tudyah Lake, which is about 2 miles long by 2 miles in width.

From here to the mouth of the river, where it joins the Parsnip about 17 miles from Fort McLeod, the country is rolling, timbered with jack-pine and spruce, good for ties. Near the mouth along the bank are strips of cottonwood and poplar flats.

The junction of Pack and Parsnip Rivers is in latitude $55^{\circ} 12'$, elevation 2,225 feet. Here the Parsnip is about 200 feet wide and flows at about 4 miles an hour about north-west. We found a different variety of fish here, known as the Arctic trout or grayling, the meat almost pure white and very fine. About a quarter of a mile below the junction a creek about 15 feet wide and 1 foot in depth flows in, up which about 3 miles are several small seams of lignite.

A range of snow-capped mountains runs about parallel to the river 20 or 30 miles back, and the intervening country is very hilly and is densely timbered with spruce and poplar and small jack-pine. Soil is sandy and gravelly.

Below here for 4 or 5 miles are spruce, jack-pine, and some cottonwood flats extending back for 2 or 3 miles, merging into the hilly country, when a small creek about 10 feet wide flows in.

Here a poplar-flat, burnt over, extends back from $\frac{1}{2}$ to 2 miles and along the river for 1 mile, running into spruce and poplar flats for 7 or 8 miles farther down; the rolling country back of this being covered thickly with jack-pine and spruce. Signs of black bear are very plentiful along this river.

The remaining country down to the Nation River, about 35 miles from the Pack, is mostly timbered with spruce, jack-pine, and poplar flats along the bank, which run back 40 to 80 chains. Other country hilly to the mountains; land poor.

The Nation River, running about north-east, is very swift and shallow, average depth about 2 feet and 150 to 200 feet wide.

Below the Nation River for about 30 miles the country remains about same; but on the remaining 25 miles to the mouth of the Parsnip there is a fairly good strip of land, consisting of benches and flats extending back to the Omineca Mountains 20 or 30 miles, heavily timbered with spruce, poplar, some birch and jack-pine, burnt over in places. A long, wet, boggy meadow about a mile from the river just below here extends for about 10 miles, by from 1 to 2 miles wide, grown with willow and scattered clumps of spruce.

This bench and flat country extends up the Finlay River to the Omineca about 17 miles. Back to the mountains from here is about 20 to 25 miles, there being about 600,000 acres of fairly good land, which I would advise subdividing. This is the only extent of good country seen during trip.

The Finlay River is about the same size as the Parsnip, but not quite as rapid. Elevation at junction of Finlay and Parsnip, 2,000 feet; latitude, $56^{\circ} 0' 45''$. About a mile below the junction of these two rivers, which then form the Peace River, are the Finlay Rapids. Here the bed of the river is about a quarter of a mile wide and the numerous big boulders and ledges, extending down-stream for 1,000 feet or more, through which the water rushed with great force, cause a bad rapid, the fall being about 12 feet. Here the Rocky Mountains close right in to river.

Wild fowl are not very plentiful along the Lower Parsnip, although there are some ducks, geese, plover, and grouse.

We then returned to the mouth of the Pack River and continued on up the Parsnip. About 15 miles above the Pack the Misinchinka River flows in on the right bank. Numerous small creeks flow in on both sides, all the way along.

For about 75 miles from the Pack the Parsnip is very swift and rapid, but from there for 60 miles there are long strips of almost dead-water, gradually narrowing into 100 and some places 50 feet. A range of mountains on each side of the river keeps gradually closing in until at Arctic Lake they are hardly more than half a mile apart.

About 135 miles above the mouth of the Pack and 225 from the mouth of the Parsnip, a small creek about 20 feet in width and 10 feet deep at mouth, decreasing to a depth of 2 or 3 feet, flows through a willow-flat into the Parsnip on the left bank. Here we turned off and left the Parsnip. Going up this creek, after about 4 miles we came to a small lake about 2 miles long by $\frac{1}{4}$ mile wide, the water in this being as clear as crystal. On coming to the end of this, which we named Arctic Lake, we found no stream by which we could proceed. The mountains here close in towards one another to within half a mile, leaving an almost flat narrow pass, which here forms the Pacific-Arctic Divide. The aneroid barometer showed the elevation here to be 2,650 feet. This strip extends for a distance of 2,000 feet east to another small lake 1 mile long by $\frac{1}{4}$ mile wide, which we named Portage Lake.

Finding an old trail across here grown up with dense willows and bush, and after having cleared it out, we portaged our supplies and hauled the canoes across. We now started down-stream towards the Fraser, but had not gone more than a mile when we came to the end of this lake and found the creek-bed leading out of it almost dry. We had to portage here again about 700 feet to another small lake about the same size, which we named Pacific. From these lakes the Dolly Varden, salmon trout, and rainbow trout, weighing from $\frac{1}{2}$ lb. up to 10 and 12 lb., can be taken with a bait or spoon hook.

Flowing out of Pacific Lake is a very swift-running stream called the Bad River (now known as James Creek), average width about 25 feet. It is very rocky and shallow, but in places there are very deep holes. We had not gone more than 3 or 4 miles down this when we found the current gradually running slower, and after going through a willow-flat came to one of the finest pieces of engineering-work ever done on this river. Here the beavers had built a dam

a number of years ago. After breaking through this, and eight more, we proceeded on downstream. The country is very mountainous all along. Observations taken about 10 miles from Portage Lake gives latitude $54^{\circ} 25' 35''$.

Below here the river widens a little and drops more rapidly. We encountered two falls, around which we had to portage about half a mile. About 5 miles below here this river joins a larger one coming in from the north (now known as Herrick Creek), and this flows into the North Fork of the Fraser after about 2 miles. Here the North Fork of the Fraser (now known as McGregor River) is about 400 feet wide. The country is very mountainous, with strips of spruce and poplar flat along its banks.

About 3 miles below this junction the South Fork of the North Fork flows in on the left (this stream is now also known as McGregor River), and 10 miles farther is the head of a long canyon which extends for about 6 miles. The mountains, gradually widening, leave large flats along the river.

The North and South Forks of the main Fraser unite about 14 miles farther down, and from there to Giscome Landing, a distance of about 27 miles, the river varies from 10 to 15 chains in width and the current runs slowly.

The weather during the time we were there was ideal. The average temperature during the day in the last week of June was 70° , at night 35° , with four nights of frost. During July, average during day 73° , night 40° , with three nights of frost. August, nightly temperature 40° , with four nights of frost. September, twelve nights of frost; 63° average during day.

The rainfall seems light. In June there was one day's rain; in July three days; in August four days; and in September three days.

In a general summary of the country, I would say that from Summit Lake to the Manson River it is mostly hilly undulating country, timbered with spruce, 8 to 10 inches; jack-pine, 2 to 10 inches; some birch, 6 to 12 inches; poplar, 2 to 6 inches; cottonwood, 1 to 3 feet; and some fir, except along the bank of a river in places where there is some light loam top soil, with gravelly subsoil. But from the Manson to the junction of the Finlay and Parsnip Rivers and extending up the Finlay to the Omineca and back to the Omineca Mountains are 600,000 acres, more or less, of fairly good land for agricultural purposes.

EXTRACTS FROM THE REPORT OF F. C. GREEN.

DATED FEBRUARY 27TH, 1911.

[Mr. Green was employed in 1910 by the British Columbia Government in making surveys in the vicinities of the Stuart and Salmon Rivers.]

The country covered by our surveys in the reserve stretching from the Stuart River Valley to the Salmon River Valley is, on the whole, flat. There are no mountains in this area, but in places where the ground is rolling the tops of the ridges are gravelly. The soil varies from a very fine silt, free from sand and gravel, to gravel on the low ridges before referred to. We did not see bed-rock during the entire season.

The area lying near Nukko and Chief Lakes, and running eastward to the Salmon, is now the more accessible part, and many settlers located here in 1910. It is probable that most of this area will be taken up by pre-emptors in 1911, as the land is generally of good quality.

The area to the north-west of Chief Lake is more inaccessible at present, and on the average is not of such good quality; but with the opening of the country by railways in the next few years this territory will support a large population.

Remains of charred stumps show that the territory within this reserve was originally timbered with large fir, spruce, and balsam, which, except in some small areas, was destroyed by fire about the year 1830. The second growth is largely jack-pine, poplar, with spruce and balsam in the more moist areas. Fires of later date have touched the country in spots, and there the new growth is generally poplar, willow, and white birch. With the exception of a small area west of Nukko Lake and some territory near Great Beaver Lake, the timber is too small for profitable lumbering.

The land along the Salmon, above our surveys, though flat, becomes more and more sandy; while the great area left south-east of Beaver Lake was avoided, as it is generally of poor quality. There is some good land lying between Great Beaver Lake and the Salmon, but it is at present rather remote from transportation. There is a large area of good land south-west

of Great Beaver Lake toward the Stuart, and also a large area south of Le Bras Creek. There is also an area of about eighteen sections north-east of Swamp Lake worthy of immediate subdivision, as settlers will no doubt go on it in 1911.

EXTRACTS FROM THE REPORT OF J. H. GRAY.

DATED FEBRUARY 28TH, 1911.

[Mr. Gray was employed in 1910 by the British Columbia Government in making surveys in the valleys of the Stuart and Necoslie Rivers.]

It is misleading to separate in a description the valleys of these two rivers—the Stuart and Necoslie—since this whole expanse of country is, properly, the valley of the Stuart River, the latter being but a shallow depression therein. There is little or no height of land between the two streams, as may be better realized when it is understood that both are slow-running streams, the Stuart flowing east and the Necoslie west, with an average distance apart of 5 miles, which is diminished to 2 miles after flowing in parallel courses for over 25 miles. The tract consists of fifty-six lots, for the most part containing 640 acres each, and aggregating in all 29,025 acres.

This tract of land is undulating, at no point more than 300 feet above Stuart River, or a general maximum elevation of 2,500 feet above sea-level. The soil is, as usual, of diversified character, running from heavy silt to light sandy loam. There is not much gravel and a much smaller percentage of lost or useless land was included than is usually met with in so large a block. The classification shows a high percentage of first-class land.

The surface is, for the most part, timbered. Poplar predominates; small willow and birch are found and there is the usual percentage of spruce and pine. Groves of spruce are found of size sufficient for milling purposes, but in no great quantity. Meadows or open spaces are infrequent. A few small ones were noted, but, generally speaking, the clearing of the land from timber would not be attended with much labour.

Living streams of most excellent water are abundant and small lakes and ponds are frequent.

The fine valley of the Stuart River possesses an advantageous position with relation to the Grand Trunk Pacific Railway and offers many inducements to settlement.

As before remarked, this surveyed area includes the valley of the Necoslie River, which tends to widen the strip of good land lying on the north bank of the Stuart. The more open stretches of land along the Necoslie River were taken up in 1905, under South African war scrip, to the extent of 2,300 acres, and while there are doubtless more open areas, the adjacent lands are just as fertile and compose the Government holdings.

The Stuart River, from where it leaves the lake, with the exception of an obstruction at the first canyon 2 miles below, an obstruction which is easily overcome, to Le Bras Creek, about 40 miles by river, is an extremely slow-flowing "regular" river, averaging fully 800 feet in width, and in many cases exceeding this. I should not think the current would reach 2 miles an hour. Over this distance of the river small steamers carrying probably a maximum load of 25 tons could operate for five or six months in the year with the greatest ease.

Approaching Le Bras Creek, where the river takes a bend from its former course of east to almost south, the current becomes swifter, and something more than half-way from this point to the junction with the Nechako River, at a point known locally as Chinlak, a bad rapid occurs.

EXTRACT FROM THE REPORT OF J. F. TEMPLETON.

DATED OCTOBER 27TH, 1911.

[Mr. Templeton was employed in 1911 by the British Columbia Government in making surveys in the vicinity of Lac la Hache.]

I found the country to the north of Lac la Hache to be a gently undulating plateau, lying some 200 feet above the general level of Lac la Hache. The side-hill to this bench is an open bunch-grass slope, the soil being black loam, about 4 to 12 inches in depth, with subsoil of brown clay loam. On the bench land itself the soil is for the most part brown clay loam, with black loam of varying depth in the depressions. The growth consists of scattered large fir, small poplar, and pine. Fine grasses, vetch, peavine, etc., are found everywhere, and the general

aspect is very open through the timber. Natural hay meadows are found in all bottoms, for the most part quite feasible in their present condition for cultivation.

To the south of Lac la Hache we did the larger part of our work. The country, once the bench is reached, is of generally level character and more open through the timber than to the north; but, otherwise, similar as to wooded growth and soil.

As we continued our work to the south we found the country abounding in natural meadows on which many of the local ranchers rely for their supply of hay. We found haystack-yards and hay-roads to practically every meadow of any size.

Throughout the country a certain amount of loose rock of varying size is found. The soil is generally free from gravel, very little being seen.

The ranchers tell me that, with irrigation, a certain crop is assured and that the soil is very productive. This is the great problem of this district. Without water extensive farming would be attended by a certain amount of risk.

EXTRACT FROM THE REPORT OF A. S. COTTON.

DATED DECEMBER 28TH, 1911.

[Mr. Cotton was employed in 1911 by the British Columbia Government in making surveys in the Nechako Valley.]

Township 2, Cariboo District, may be described as rolling, except Section 18, which is broken by several fairly high hills. From the north boundary of this section a good view of the country to the north-west is to be had, and it is similar to that portion over which I worked. The soil is gravelly and rocky. A few small lakes, or ponds, with muskeg margins exist.

I cut a wagon-road across Sections 6, 5, 9, 10, and 11, over which I moved camp with a four-horse team. I then proceeded to the east of Township 10. and finished that portion lying between there and the Stuart River on the east and the Nechako on the south. There are some open patches in this area, but the greater part of them are muskegs. The timber in the southerly portion is chiefly poplar, with spruce and jack-pine of small size, while that in the northerly part is spruce. The soil is light loam, with gravel ridges in places. There are several small lakes in this section in which beaver abound.

Owing to the very dry season all the creeks had dried up and water was very scarce. There was very little rain during the summer, but, notwithstanding, the crops were excellent and the settlers were correspondingly jubilant.

EXTRACT FROM THE REPORT OF R. SMITH.

DATED JANUARY 24TH, 1912.

[Mr. Smith was employed in 1911 by the British Columbia Government in making surveys on the Canoe River.]

The Canoe River is a rapid stream varying from 150 to 400 feet in width in low water, with a depth of 2 to 4 feet, and running over a bed of boulders in the rapids and gravel-bars or sand in the other reaches. The river rises about 6 feet and spreads to a width of 400 to 600 feet during high water. The speed of the current is about 2 to 10 miles per hour.

The elevation at the confluence of the Canoe and Columbia Rivers is about 2,000 feet, and the fall of the Canoe River is about 10 feet per mile.

The valley runs south-east, maintaining a width of $\frac{1}{2}$ to 4 miles of benches and foot-hills, with a range of hills on each side attaining an elevation of 8,000 to 11,000 feet.

All reports from explorers who had been through the valley represented the country as being clear of underbrush. These reports were erroneous, as the timber is thicker, although smaller, than it is in the Kootenays. The timber consists of fir, cedar, hemlock, jack-pine, poplar, birch, and spruce.

Practically all of the west half of the valley and the gullies containing small creeks in the east half are timbered with cedar, fir, and hemlock, while the level benches are covered with jack-pine, birch, and poplar, while there are several groves of poplar and birch growing on well-watered easy slopes. There is also a fringe of medium sized spruce timber along the river-banks. The timber is apparently half grown since the last fire, the average size of cedar and fir being about 1 foot, whereas in one gully there was one fir-tree 6 feet and two cottonwood-trees of equal



CANADIAN NATIONAL RAILWAY, UPPER FRASER VALLEY.



PTARMIGAN MEADOW, CANOE CREEK.

diameter. The birch and poplar showed about 18 inches maximum diameter, while the jack pine was from 1 to 12 inches. The hemlock is practically useless except for firewood.

The soil consists principally of sandy loam about 6 inches thick in well watered sections, while on the drier jack-pine benches there was about 1 to 6 inches of loam interspersed in some parts with gravelly ridges. The subsoil invariably consisted of whitish sand, apparently well washed. Three beaver-meadows were found, two of which were in use and inundated, but situated at an elevation allowing drainage of almost the entire surface, while the third was perfectly dry and showed splendid black loam.

The valley is well watered by a number of small streams of clear water and several springs, except the long ridge running up on the north side of Howard Creek, which was found to be very dry, but which probably contains a number of hidden springs.

The sections are badly cut up by the Canoe River, which runs over a bed of boulders at a speed varying from 2 to 6 miles per hour in low water. A ford is quite practicable below Goat River (now known as Hughallan River) in low water and impossible in high water, as the depth of water varies from 2 to 6 feet. Above Hughallan River for several miles a ferry could be operated with economy, as the river runs about 2 miles per hour and is about 4 to 10 feet deep, with a sandy bed.

The autumn of 1911 being an exceptionally dry one, the precipitation could only be surmised. Apparently the rainfall is an average one, and the snowfall slightly below the average for the Columbia River Valley. The rain and snowfall probably approximates the similar precipitations in the Salmon Arm country on Shuswap Lake.

The climate during our stay was exceptionally clear, rain falling on eight days in seven weeks and snow on two days. Each storm cleared up with a westerly or northerly breeze.

The temperature was probably 5° lower than that of Revelstoke or Golden, on the main line of the Canadian Pacific Railway, for the corresponding period.

EXTRACTS FROM THE REPORT OF W. G. McELHANNEY.

DATED MARCH 12TH, 1912.

[Mr. McElhanney was employed in 1911 by the British Columbia Government in making surveys on the Upper Fraser River below the Yellowhead Pass.]

A general view of the Fraser Valley from Tete Jaune Cache north-westerly shows a width of approximately 4 miles to the base of the mountains on either side. This has nearly all been burned over, as has also the mountain-side, except for a fringe of timber part way up the mountain on the south side and a few patches in the valley. This is now grown up thickly with poplar, willow, jack-pine, birch, and spruce. Formerly there must have been timber of considerable size, for there is still to be found standing fir and spruce measuring 3 feet at the butt. There is a considerable area of swamp land about the level of high water, which, by dyking, could be readily brought under cultivation. This land is frequently very much cut by sloughs and back channels of the Fraser River.

The greater part of the timber in the valley has been destroyed by fire, but in scattered draws there still remains fir and spruce up to 3 feet at the butt. In some of the low-lying land close to the river there is frequently found thick growth of spruce, not generally over 1 foot in diameter. The cedar presents a good exterior appearance, but is frequently found to be decayed at the heart. This timber is easy of access, but is limited to about 80 to 100 acres. South of this, along the base of the mountains, there is a fringe of timber—fir, spruce, jack-pine, and cedar—extending continuously to Sand Creek (now known as Tête Creek). On the mountains on the north side of the river there is very little timber. The rest of the valley is covered with willow-brush in the swamps, jack-pine and poplar on the benches, with occasionally some alder, birch, and young fir and balsam. It would appear that the hillsides are capable of supporting timber, as evidenced by the healthy nature of the young fir found and also the remains of fair-sized timber, but the dryness of the climate cannot be favourable to rapid growth. Reforestation of these hillsides would conserve the limited supply of rainfall for the rather light and sandy soil of the valley.

In general, the land in the valley near the Cache can be described as sandy loam, though more sand than loam, and better quality on the north side than on the south side of the river. On the south side the wash from the Mica Range is mostly mica sand, and this prevails almost

entirely throughout the season's work on this side. Where it has not been burned over there is a top dressing of decayed vegetation and some loam, but where fire has burned off the timber there is little left but fine sand. In the swamps and low-lying land close to the river there is interspersed with the sand a fine clay scarcely distinguishable from sand. This appears to contain nourishment for plant-life, as evidenced by the thick growth of willow, poplar, alder, and spruce. On the north side there is less mica sand with more clay and loam. The sub-soil is sand, but on the surface, especially on the lower land, the sand is more plentifully interspersed with loam.

This soil will produce all kinds of vegetables. On Lot 6010 there are three gardens in which were seen growing potatoes, turnips, carrots, cabbages, lettuce, beets, onions, etc. These had received irrigation, and as the season was dry and they were planted late had not matured well but gave evidence that under better conditions good vegetables could be grown on the soil.

Farther westward down the valley there is considerably more clay and loam in the soil, and in the vicinity of Horsey Creek, about 2 miles west of where we completed the season's work, there was a very good clearing of about 15 acres of medium-quality loam capable of growing good grain and vegetables.

This land is situated in the Dry Belt, and consequently, during the summer months, there is very little rain. Not more than 2 inches fell during the three months we were in the valley, but there is plenty of sunshine. The highest temperature was recorded on August 4th—100° in the sun. The nights are cool, the days clear and bright, with generally floating clouds or haze. During July, August, and September there were frosts, that in August destroyed the potato-tops. In 1910, I understand from residents, there was a great deal more rain and no summer frosts and garden produce matured well.

In general, the climate is delightfully warm during day, cool at night, with plenty of sunshine and little rain. From October 6th to 10th Chinook winds prevailed, and the temperature was as high as 90° F. and not lower than 48°. From residents I find that there is not a great depth of snow in winter and the days are generally bright and the atmosphere dry. Chinook winds generally drive the snow away about April and at the same time the river opens for navigation. As a rule it closes about November 1st.

To obtain the best results from this land irrigation is necessary. The lightness of the soil and the dryness of the climate demand it. It is attended with little difficulty in this section, for there are numerous small sections fed from the adjoining mountains and larger streams which flow through the gaps in the ranges adjoining the river, which furnish a constant water-supply. Added to this, the natural fall of the stream, the slope of the land from the mountain to the river, and the splendid opportunity for storage, there is an ideal condition of affairs for a small project or for a considerable area. Creeks like Kiwa, Small, Tête, and Horsey are, roughly speaking, 20 to 30 feet wide in low water, and between these are numerous small creeks, all of which in the driest weather are running streams.

There is an abundance of cranberries, raspberries, wild currants, strawberries, etc., and the soil and climate are favourable to the growth of this kind of hardy fruit. In general, I see no reason why the hardier kind of apples should not be successfully grown, the bright, sunny days being conducive to a high grade of fruit; but there is always danger of destruction of the blossoms by frost. The elevation is approximately 2,400 feet above sea-level and the valley is well protected from north winds. The north side of the river would be most suitable for this purpose.

There are large deposits of mica in the mountains about 5 miles south-west of Tete Jaune Cache. Numerous claims have been staked and some development-work done, but for lack of transportation, the work has been abandoned for the present. The samples are of excellent size and the arrival of the railways will no doubt stimulate the industry. There is always to be found a certain amount of gold in the sand of the Fraser River, but whether it exists in sufficient quantity to make dredging profitable is problematic. The small creeks nearly all carry gold, but as yet no paying proposition has been discovered. Some work has been done on Small Creek. No indications were found of any other minerals, though near Moose Lake samples of lead iron, galena, silver, and gold were discovered.

There is very little game in this section of the country, owing largely to the unnecessary slaughter by the Indians of large numbers of deer and goat. Grouse and duck are abundant, and farther down the river moose are numerous. A few bears were seen, but they are not numerous. Salmon come up the Fraser as far as Tete Jaune Cache, but by the time of their

arrival they are not of good quality. Very few fish are found in the tributaries of the Fraser in this vicinity.

Water-power in large quantities is not easily obtained from the river, as there is a gradual fall in this vicinity. Small plants generating several hundred horse-power could be easily established on the creeks previously mentioned, and storage-dams could be readily made where these streams emerge from the gap in the mountains. This could be carried out simultaneously with an irrigation project.

In general, the climate is delightful, the land very light, timber is scarce, and irrigation is necessary to obtain best results. Clearing is easy and accessibility good.

EXTRACT FROM THE REPORT OF W. MEYERSTEIN.

DATED OCTOBER 21ST, 1912.

[Mr. Meyerstein was employed in 1912 by the British Columbia Government in making an exploration of a route from Bella Coola to McLeod Lake.]

From Stuart Lake to Fort McLeod the distance by trail is approximately 82 miles. On leaving Stuart Lake the ground rises gradually, and at 8 or 9 miles an elevation of 2,500 feet is reached. In the first few miles the trail passes by some fine open meadows. The soil is a black loam, free from stones, and is suitable for cultivation. The Hudson's Bay Company make use of these meadows for cutting hay. Between the meadows are low sandy ridges covered with jack-pine and here and there a few poplar. The soil is too dry for cultivation and too high above the stream-levels to irrigate, but if the timber were burned off would grow good grass.

Beyond, and running to Carrier Lake, the country improves. The soil appears to be a moist sandy loam and is in most places free from stones. The country is undulating and covered with poplar, small spruce, and willow, between which is a luxuriant growth of peavine, fireweed, and grasses. The greater part of this country is fit, or could be made fit, for agriculture.

Carrier Lake is a small sheet of water about 3 miles square. On the south shore, through which the trail runs, the hills rising from the water's edge are not very steep, nor very high, and are composed of a sandy loam soil or a gravel subsoil. This grows good grass and peavine and affords good agricultural land. The timber is chiefly poplar, with a few scattered spruce-trees. To the north of the lake the hills are rolling and are covered with a second growth of jack-pine and spruce, not of commercial size. By burning off this timber a good grazing country could be produced.

For the next 2 or 3 miles from Carrier Lake the country is fit for agriculture. The soil is a light sandy loam, easily cleared of the light growth of poplar and jack-pine which at present cover it.

Beyond is the valley of the Salmon River, the trail following over a sandy jack-pine flat. The soil is poor and stony and quite useless for agricultural purposes. The Salmon River Valley at the trail crossing is about a quarter of a mile wide and about 60 feet deep. In the bottom is a good meadow, growing wild hay. The soil is moist and sandy, with a gravel subsoil, and is capable of cultivation. Here the Salmon River is some 50 feet wide and 2 feet deep, with a current of about 2 miles an hour. The valley above the crossing was not explored, but on either side of the river and for a distance of some miles up there appeared to be a narrow strip of good bottom land suitable for agriculture.

From Salmon River to Swamp River (now known as Muskeg River) the country is broken up and consists of a series of stony ridges, growing stunted jack-pine. Between these ridges are small swamps and bogs which could be drained, but are not of sufficient size to warrant any great expenditure.

Muskeg River, a tributary of the Salmon, is a small stream about 30 feet wide and 18 inches deep. It flows through a valley nearly a quarter of a mile wide, in which are numerous small meadows. The soil here is not of sufficient depth for cultivation, but will grow grass for grazing purposes.

Between Muskeg River and Carp Lake the country is more or less level. The soil is poor and sandy and is covered with a dense growth of small stunted jack-pine. This country forms the divide between the waters of the Arctic and Pacific Oceans and is approximately 2,600 feet above sea-level.

Carp Lake lies at an elevation of about 2,700 feet. It is about 6 miles long and lies sunk in the hills, which rises steeply on all sides. The country surrounding it is covered with a thick growth of jack-pine, the soil being composed almost entirely of sand and gravel and is unfit for cultivation.

Carp Lake flows into Long Lake (now known as War Lake), a small sheet of water some 2 miles in length, with banks rising steeply to about 100 feet to join the plateau-level. Out of Long Lake flows McLeod River, a small stream some 60 feet wide and 18 inches deep. About a quarter of a mile below the outlet of the lake the stream becomes swift, and just beyond is a series of rapids and falls, the water descending in three long leaps of about 40 feet each. There is not sufficient water to use this for power purposes, but it could be used to advantage in irrigating the level jack-pine terraces, which descend gradually from here to McLeod Lake. These terraces have a dry sandy soil, fairly free from stones, and with irrigation could be profitably cultivated. At the border of McLeod Lake, McLeod River is again crossed at its mouth. Here it is a stream some 50 feet wide and about 2 feet deep, with a rapid current.

McLeod Lake is about 16 miles long and has an average width of about 2 miles. The shores are steep and densely wooded with jack-pine and spruce, the latter seldom exceeding 12 inches in diameter, and not being in sufficient quantity to form any staple interest in lumbering. On the west side the hills rise steeply, some 400 or 500 feet, to the plateau crossed by the trail from Stuart to McLeod Lakes. On the east side the hills are higher, in places rising over 1,000 feet above the lake-level, then sloping down to the Parsnip River, some 2 or 3 miles distant.

These hills might be called the foot-hills of the Rocky Mountains, being only separated from the latter by the valley of the Parsnip River, which flows parallel into McLeod Lake. Around the east and part of the west sides of the lake is a narrow strip of fairly level land, covered with small jack-pine and poplar trees.

The soil is dry and sandy, with a subsoil of gravel. In places where the timber has been burned off good grass was seen, but on the whole the soil is not of sufficient depth to stand cultivation.

At the south end of the lake on either side of the Crooked River is a patch of approximately 1,000 acres of good bottom land. The soil is a brown loam on a fine silty subsoil, covered with willow and alder-bushes. This can be easily cleared and the land is well adapted to mixed farming. At its mouth the Crooked River is nearly still water and is about 50 feet wide and 3 or 4 feet deep. It runs through a well-defined valley which has an average width in the bottom of about a quarter of a mile. On either side are steep ridges and hills composed of sand and gravel, which grow a stunted jack-pine.

EXTRACT FROM THE REPORT OF A. W. HARVEY.

DATED NOVEMBER 7TH, 1912.

[Mr. Harvey was employed in 1912 by the British Columbia Government in making an exploration on the Parsnip, Finlay, and Peace Rivers.]

For the first 6 miles the trail from Stuart Lake to McLeod Lake runs through good land, lightly timbered with poplar, pine, and spruce, well watered, small lakes and meadows occurring at short intervals. Then the nature of the country changes, and the soil becomes very sandy and in parts very stony, the timber consisting almost entirely of small pine.

About 30 miles from Stuart Lake the trail crosses the Salmon River, passes through a rough broken country, very sandy, with frequent small willow swamps and muskegs. About 15 miles farther the trail reaches Carp Lake, a considerable body of water, with numerous islands. From this lake McLeod River, a large stream, runs through War Lake (formerly known as Long Lake) to McLeod Lake. This river carries nearly half of the water which leaves McLeod Lake as the Pack River. About a mile below the outlet from War Lake there is a series of falls on McLeod River, from which an enormous amount of power could be obtained.

There are three distinct falls, the first of which has a drop of about 40 feet; the second, about 100 yards farther down, drops about 10 feet; while the third, and lowest one, has a perpendicular drop of nearly 100 feet. The country through which McLeod River flows is very rough, broken, and stony.

About 6 miles from Fort McLeod the trail descends sharply to a large flat, extending to the shore of McLeod Lake. The soil on this flat is very poor and stony and is thickly covered

with a growth of small pine. On reaching Fort McLeod, I obtained canoes and Indians and proceeded down the Pack River.

This river at low water contains little more than sufficient water to take a loaded canoe over the rapids, which are numerous. About 6 miles from its outlet from McLeod Lake the Pack River runs through a small lake, about 3 miles long by $1\frac{1}{2}$ miles wide, known as Tudyah Lake, and about 7 miles below this lake it enters the Parsnip, at an elevation of about 2,170 feet. There are small flats of good land along the Pack River, but the country traversed by it is very rough and hilly and the amount of land suitable for agriculture is very small.

On reaching the Parsnip River, I found the water very high and muddy. Above the mouth of the Pack a wide flat, slightly rolling and timbered lightly with pine, spruce, and poplar, extends for from 6 to 8 miles to the foot-hills of the Rocky Mountains.

The low flat along the river has an average width of about 1 mile between benches, about 150 feet high, the river winding from side to side between these benches. The river is broken up by numerous sloughs and islands; these islands and the low river-flat being generally covered with a heavy growth of spruce and cottonwood, the benches being more lightly timbered.

A large portion of this country has been swept by fire. The east side of the Parsnip, between the Pack and Nation Rivers, is very rough and broken, and, except for the river-bottom and a few small benches, is unfit for agriculture. About 40 miles below the mouth of the Pack the Nation River enters the Parsnip from the west, a large stream of clear water about 40 miles in length from its source, in the Nation Lakes, to the Parsnip.

I ascended this river for about 15 miles, passing through two rock canyons and numerous rapids. The country traversed by the Nation River for its entire length is very rough and broken, and, with the exception of a few small flats along the river, is quite valueless. There are numerous indications of coal along the Nation River.

Returning again to the Parsnip, I found the country on both sides of the river very rough and broken. On the west side of the river, below the mouth of the Nation, a range of hills, very rough and heavily timbered with spruce and birch, extends down the Parsnip near the river for a distance of about 16 miles; these hills rising to a height of about 700 to 800 feet above the river.

On the western side of this range of hills there is a wide valley extending to the main range, forming the western boundary of the Parsnip and Finlay Valleys. This valley appears to be rough and heavily timbered, except for a large wet swamp, about 10 to 12 miles in length and from 1 to 2 miles in width, which commences at a small lake about $1\frac{1}{2}$ miles north of the Nation River, and follows the course of a stream which runs from this lake into the Parsnip, which it enters about 17 miles below the mouth of the Nation.

From the mouth of this stream northerly to the Omineca River lies a very large stretch of generally level rolling country, timbered lightly with spruce, pine, poplar, and birch. This tract is bounded on the east by the Parsnip and Finlay Rivers, and on the west by a high range of snow-mountains, and is about 15 miles in average width. The soil is chiefly a light sandy loam.

On the east side of the Parsnip, below the mouth of the Nation River, a range of low hills, not so rough as those on the west side, follows the river as far as its junction with the Finlay. Between this range and the foot-hills of the Rocky Mountains lies a low valley, about 4 to 5 miles in width opposite the mouth of the Nation, and gradually narrowing to the north, its width opposite the Finlay being about 2 miles. This valley is generally level, though broken by small hills, and is timbered chiefly with small pine; the soil is a light sandy loam.

The Parsnip River abounds in fish, the most numerous being the grayling, or Arctic trout, which rise very readily to the fly; rainbow trout are also found, but are fewer, and at the mouths of the small streams entering the main river large Dolly Varden trout can be caught, some of which will weigh nearly 10 lb. Beaver are numerous in the swamps and smaller streams.

The Parsnip River has an average fall of about 2 feet to the mile, the elevation of its junction with the Finlay being about 2,000 feet. On reaching this point, I ascended the Finlay River, camping the first night at Pete Toy's Bar, which is very rich in a fine flour gold, probably brought down by the Omineca River. Near the mouth of the river on the east side is a large flat of good land, containing about 5,000 acres, consisting of heavy clay loam and sandy loam, and timbered with spruce, pine, and poplar, partly burnt.

EXTRACTS FROM REPORT OF F. TUPPER.

DATED DECEMBER 9TH, 1912.

[Mr. Tupper was employed in 1912 by the British Columbia Government in making surveys near the southern boundary of the Cariboo District in the neighbourhood of Williams Lake.]

As regards the agricultural possibilities of the country, I would point out that outside the valleys little or nothing has been attempted in the way of farming. The settlers there at the present time, with few exceptions, have done but little in the way of growing crops or vegetables. There are, however, one or two notable exceptions, and of these I would particularly mention Mr. S. Sorensen, who is located on Long Lake. Mr. Sorensen is a farmer in the truest sense, and his efforts appear to be meeting with a surprising degree of success. He appears to have paid careful attention to the principles of dry-farming, and his estimate of his crop for last season was: Oats, 60 bushels to the acre, and wheat 30 bushels to the acre, while his potatoes were as fine a sample as any one could wish to see. Mr. Sorensen dug several bushels in my presence, and I have never seen anything better. His other roots, crops, and vegetables were first-class, and the results attained by him go to demonstrate what can be done on that particular class of land.

In the valley of Chimney Creek the land along the creek has been taken for a number of years, and the settlers, for the most part, appear to be doing well, and are irrigating their holdings by gravitation. Mr. H. P. Felkir, one of them, puts up a large amount of hay every season, grows all kinds of vegetables, and goes in extensively for stock-raising and dairying. Farther down the valley is Mr. F. Isnardy, who has a considerable area of hay meadow and grows plenty of vegetables, and also has a considerable herd of cattle. A little farther on is the ranch of Mr. Wm. Pinchbeck, which is a splendid property, and when I was there Mr. Pinchbeck was busy harvesting splendid crops of wheat and oats, while he had an abundance of all kinds of vegetables. He also has a considerable number of stock. This, I consider, is about the best-managed property in the Chimney Creek Valley and reflects great credit on the owner. There are a number of other settlers along the valley, almost all of whom seem to be able to make a comfortable living from their holdings.

On the Springhouse Prairie quite a number of settlers have located during the last two years, but beyond erecting a cabin on each pre-emption and planting a few potatoes, etc., not much has yet been attempted.

At Springhouse Ranch, of which Mr. Boitano, who has been there about twenty-five years, is the holder, beyond growing a quantity of hay and a few vegetables, practically no attempt has been made at farming. Mr. Boitano has, however, a good number of stock and makes a considerable quantity of butter. In my opinion this property is well adapted for the purpose of dry-farming, and should the example set by Mr. Sorensen be followed, I have no doubt as to the success of the venture.

There is one serious drawback, however, which applies to farming of all kinds in this particular district, and that is summer frost. The past season was a good one in this respect. There was very little frost and an unusually heavy rainfall, the like of which, old settlers informed me, had not been seen for many years.

As regards frost, however, there is the probability that with settlement and cultivation it will to a large extent disappear, as, I understand, has been the case in the Prairie Provinces.

Up to the present the attempt at farming has been entirely confined to the open prairie land, no attempt having been made, as far as I am aware, to experiment with any of the timbered country, and, in my opinion, the soil in some parts where the fir, spruce, and poplar occur is quite as good as the open prairie. However, it is not to be expected that this class of country will be taken up as long as there is open country available, as the cost of clearing is a serious matter with the average pre-emptor. I think it is probable, however, that when the open country is all taken up and a railway is constructed through that country, much of the land that is now apparently looked upon as useless will be taken up, cleared, and cultivated; and the results may be surprising.

GOOD RANGE COUNTRY.

At the present time, with the lack of transportation, etc., the country is, in my opinion, only good range country, and the numerous herds of cattle that I saw running there were in excellent

condition. This country is for the most part likely to remain range country for some time to come unless dry-farming is carried on along the same lines as that adopted by Mr. Sorensen on his pre-emption on Long Lake. Otherwise, I think it is idle to expect payable results without irrigation.

As regards water-supply, there is, with the exception of Chimney Creek, no streams of a permanent nature running through the tract surveyed by me last summer. There are, however, a number of small, scattered lakes that contain good stock-water, and I think a good supply of excellent water for domestic purposes could be obtained almost anywhere by sinking wells to a depth of, say, about 40 feet. Several of the settlers have obtained an abundant supply at even lesser depths than this.

As regards timber, there are some patches of very good fir in Township 44, but the average per acre was, in my opinion, not sufficient to justify me in classifying any of it as timber lands. There is an abundant supply of fuel. Settlers would have no difficulty whatever in obtaining plenty of logs for building cabins, and with a small mill could cut plenty of lumber for building purposes generally.

In conclusion, I would say that, although the climate is, on the whole, dry, in the summer it is not too hot. The winter is cold, with considerable snow at times. It appears, however, to be a very healthy district, and all the settlers there seem to enjoy excellent health.

EXTRACT FROM REPORT OF W. G. McELHANNEY.

DATED DECEMBER 11TH, 1912.

[Mr. McElhanney was employed in 1912 by the British Columbia Government in locating and surveying the 124th meridian of longitude, commencing at the 52nd parallel of latitude and running north for 43 miles.]

This section of country is a rolling plateau, well drained by the Chilanko, Chilcotin, Clisbako, Baezaeko, Blackwater, Euchiniko, and Chilako Rivers (this river was formerly known as the Mud River), all running easterly to the Fraser River and rising in the Igachuz range of mountains. The general conformation is a series of rounded broken ridges forming the watershed of these rivers. In general, these rivers are from 10 to 15 miles apart, and the ascent from the rivers is very gradual. The rivers are at elevations from 2,800 to 3,300 feet, and ridges from 4,500 to 4,700 feet. These rivers, with their tributaries, and numerous small lakes, make this a well-watered country. The valleys are narrow, and while very few meadows are found along the main rivers, they are to be found on nearly all tributaries. There are numerous small meadows scattered through the timber on the ridges. The country gives the appearance of having been at one time better watered than at present. What were once lakes are now dry meadows, with a shallow coating of earth over boulders. Muskegs are numerous, but generally cover only a small area. The remainder of the country is covered with jack-pine. Much of this has been burned, the timber has fallen, and a dense growth of young jack-pine is coming up through the windfall. This condition makes travelling through here exceedingly difficult.

TIMBER.

There are thousands of acres of virgin forest of jack-pine. The trees, especially near or on the tops of ridges, are tall, straight, clean-trunked, about 10 to 12 inches in diameter, and growing very thickly. By a special sulphide process jack-pine can be made into paper, and I understand that by creosoting it can be made into serviceable ties. If this could be transported at not too excessive cost, there is room for a profitable industry throughout all the Northern Interior. Not only would this be a means of revenue, but the land thus cleared would make an excellent range country. As it is now, there is very little grass growing amongst the timber, and the heavy windfall prevents cattle getting through it. Small spruce are generally found in draws and on wet or swampy ground. This, as a rule, is not over 15 to 18 inches in diameter. The only piece of heavy spruce we saw this season was about 7 miles west and 3 miles south of where our line crosses the Euchiniko River. Here we saw spruce 3 to 4 feet in diameter, but its extent was limited. Fir grows only on the slopes immediately adjoining the rivers, and there it is very scattered. Small poplar and willow are to be found interspersed throughout the jack-pine. Practically the whole country is timbered. Fires are very frequent and much of the country has been burned over.

LAND.

The whole country is glacial drift, sloping to the eastward. The ridges are gravelly soil, in places gravelly or sandy loam interspersed with stones and boulders. Where fire has occurred the decayed vegetation is burned off and gravel and sand exposed. In very few places is there much surface soil, while the subsoil is very hard and compact, consisting of sand, gravel, clay, and loam scarcely permeable by water. Where a depression occurs the erosion of the surrounding slopes has covered the boulders underneath with a thin coating of good soil, on which is generally found some grass. This appears to be the origin of most of the meadows found at the higher elevations. If the depression is of sufficient depth, lakes are formed. Numerous shallow lakes of this nature, with apparently no outlet or inlet, were scattered throughout the timber. These appear to be drying up. The valleys of the rivers are usually narrow, but the land is good, consisting mostly of silt and capable of producing good hay. Wild hay on these valleys is abundant and could be further increased by irrigation, for which conditions are favourable.

In the valley of the Chilanko on the north side of the river there is some land, both east and west of the meridian, which could be easily irrigated from Puntzee Lake, which is about 240 feet higher than the river and has an easy outlet for a ditch. At Puntzee Lake there is very little good land not already alienated. The hills come down very close to the water.

Just west of the meridian from Mile 26 to Mile 30 there is a good valley in the Chilcotin River. This land is almost all taken up by pre-emptors, but about 5 or 6 miles farther up the river there is a large brush meadow containing good soil. Between these two meadows is a fine water-power. The valley of the Clusko River is narrow and very much broken and of little value.

From here to the valley of the Blackwater there is practically no land fitted for agriculture. The elevation is on an average 4,000 feet and the land is almost entirely covered with jack-pine and windfalls with numerous muskegs. There are some meadows along small creeks, but of very limited extent.

On the Blackwater River, about 4 miles to the east of the line, there is a considerable area of good land covered with poplar and jack-pine. The soil is a gravelly and sandy loam and grass and peavine grow abundantly. Water is plentiful and range good. This is already surveyed and is the best piece of land we saw during the season. To the west of the meridian the valley narrows; the hills with southern exposure are sparsely timbered, but are covered with grass. To the south of what is called Euchiniko or Lockhart Lake the country flattens out, is covered with jack-pine and has numerous muskegs, but I believe this would make fair agricultural land if cleared.

The rolling divide between the Blackwater and Euchiniko Rivers contains patches of good land where spruce is growing, but this is mostly confined to limited areas. On the Euchiniko the valley is narrow, widening to the eastward, where it merges into the valley of the Blackwater, previously described. To the westward the valley is narrow and there are only small parcels of tillable land. This is a good range country, the hills to the north of all rivers and streams being well covered with grass. The valley of the Chilako River is also narrow, with practically no agricultural land unsurveyed. Like the Blackwater and Euchiniko, the hills on the north side are grass-covered. From here on to Mile 43, where we finished our season's work, the ascent is very gradual. There are numerous spruce and tamarack swamps containing good soil if drained, but meadows are few.

CLIMATE.

The climate is excellent, the air bracing and clear. Rainfall is very light. The nights are cool and the days moderately warm; frosts occurred every month during the summer at elevations of 3,300 feet and over. There are nearly always light clouds floating in the air. The winds are light and very variable. I append a table covering a period of about five months, giving thermometer readings morning, noon, and evening, maximum and minimum temperatures, general weather conditions, such as clouds, rainfall, etc.; also appended is a series of thermometer readings taken by a settler on the Chilcotin River, Mr. E. D. Sherringham, just west of the meridian. The elevation of his ranch is about 3,300 feet. These readings are for January, 1909, the coldest weather in a great many years. I also obtained readings from him for January, February, and March, 1912, an average winter.

The snowfall is light, in general about a foot at this elevation. Cattle range till about December, and require to be fed from one and a half to three months, according to the season.

I would suggest that settlers in certain districts be provided with standard thermometers to be read daily for the entire year. This would give more reliable data for a district than that obtained by a surveyor who is constantly changing place and altitude, and would give data for seasons of the year which have as much effect on the possibilities of a country as the summer months. I saw no grain grown by any settlers in that district, their energies being confined to stock-raising.

AGRICULTURAL POSSIBILITIES.

Land for agriculture is limited almost entirely to the river-valleys. Along the Chilcotin River to Alexis Creek all kinds of grain and vegetables can be grown. Farther up the river, where elevation reaches 3,300 feet, I believe hay and oats could be successfully grown. Potatoes require a favourable season. Small garden-stuff was seen growing at Sherringham's. Settlers in here depend entirely on ranching, and as yet have not attempted growing timothy or grain, though they believe it would be possible. Potatoes seem to do better on benches a little above river-levels. Near the Nazko River, in valley land at about the same elevation as the Chilcotin, Blackwater, and Eucharinik Rivers, I saw splendid oats, barley, millet, brome-grass, and all kinds of garden produce. This was the result of experimenting with samples sent out by the Government. I did not see anywhere grain grown on jack-pine benches, and do not consider that the greater part of this country is suitable for agriculture on account of frosts, elevation, and poverty of soil.

With increased knowledge of the principles of scientific dry-farming, there are portions that might possibly be profitably cultivated. So little is known of the results of dry-farming in this portion of the country that it is difficult to judge whether it could be profitably carried out or not. I might mention that on a high bench near the Telegraph Trail at Chilako River, elevation 3,500 feet, I saw a bunch of clover a foot high growing quite green on October 27th. From conversation with settlers I find there is a tendency to neglect experimenting with farming as long as they can find wild hay and range for their stock, stock-raising being more profitable. It would seem to me advisable that the Government urge settlers to make use of the offer of free samples of grain, etc., or to establish throughout the interior of British Columbia experimental farms at different elevations, and not in the most favourable localities, in an attempt to find out the possibilities of some of the poorer land.

GAME.

Deer are plentiful; a few caribou were seen. Traces of moose, black bear, grizzly bear, and lynx were seen from Blackwater to the summit between the Chilako and Nechako Rivers. Beaver are very plentiful in all the rivers and small creeks. There is excellent trout-fishing in all the streams. Fisher-marten, muskrat, and mink are also to be obtained. Grouse are very plentiful.

RANCHING.

Ranching is confined largely to the river-valleys, the meadows adjoining the rivers furnishing the winter feed and the slopes of the river the summer range. There is very little grass growing among the timber, and what there is is of poor quality, so that this industry is limited in its extent. If the timber were removed and grass sown it would be an ideal range country, as water is plentiful.

WATER-POWER.

There is plenty of water-power on all the large rivers crossed. As there was a party in this vicinity this summer measuring the streams, we did not endeavour to secure any data.

MINERALS.

The only mineral found was a small quantity of magnetite, detected by panning in the sand of the Clisbako River. No trace of gold was found either in the panning of placer deposits or of crushed quartz. Outcroppings of rhyolite, basalt, and conglomerate were noticed, but no quartz in place. A small quantity of quartz, jasper, and apatite were found, but only as float.

EXTRACT FROM REPORT OF A. W. JOHNSON.

. DATED DECEMBER 14TH, 1912.

[Mr. Johnson was employed in 1912 by the British Columbia Government making surveys between Tete Jaune Cache and the North Thompson River.]

The valley of the McLennan River is from 3 to 4 miles wide, timbered with jack-pine and poplar, and at first sight appears very sandy, but on closer inspection a clay subsoil is found in many places, and water is observed trickling out of the cut-banks of the river. The McLennan River is about a chain in width, and I did not treat it as a natural boundary, as at low water it is easily fordable, but I made the traverse showing both banks. The rivers during June and July were at their highest, and boating, even on the McLennan, which is comparatively a slow stream, was found impracticable.

Cranberry Lake, which is about 700 acres in area, lies on the divide between the McLennan and Canoe Rivers. Its height above the Cache, from which it is 12 miles distant, is very slight, and as a result the McLennan is a very crooked stream indeed, as is the Canoe in this vicinity and in the 30 miles farther south. The lake drains naturally through Cranberry Lake into the McLennan, but it is a mere trickle. I believe it drains through a series of beaver-dams at the east end into the Canoe, but there is no well-defined outlet. The lake itself is of beaver construction, and must have been quite recently a spruce-swamp, for there are many old roots under the water, which is nowhere more than 3 or 4 feet deep. The beaver-work is nearly all at the east end of the lake, from which I think it natural to infer that the original tendency was for the water to drain in that direction. It would be perfectly feasible to empty this lake either into the McLennan or the Canoe, but I have made the shore of the lake the boundary of the lots. It has nothing to justify its perpetuation as a lake, except that it makes a fine foreground for photographs of the surrounding mountains. So shallow that your paddle stirs up evil smells all the time, and while we were there, at any rate, avoided by ducks and geese, it would fulfil a higher destiny as a hay meadow. The water is warm in summer and almost stagnant; quite unfit to drink.

Besides the lake proper there is a large beaver-swamp at the east end of 200 acres covered with mossy vegetable matter to the depth of many feet. At the west end of this lake the swamp land has dried and grows good hay. Cranberry Lake is so called because there are no cranberries anywhere near it.

There must at one time have been a lake all over this valley, extending from the Cache to the Canoe Mountain and for a short distance up Camp Creek towards the Albreda Summit. There is, at any rate, in that area a deposit of sand on the level, whilst on the slopes and benches the soil is better. Mica Creek and therefore the McLennan are so full of mica at high water that they are not fit to drink. The same applies to the Canoe.

Wherever there is moisture, as in long creeks or in muskegs, spruce, willow, and poplar grow. There is a little horse-feed scattered about in this valley, but the Grand Trunk Pacific contractors fed their horses on it all summer, and by August nothing was left. There is no considerable area of range land, so it is not a stock country.

East of the valley between Swift Creek and the Canoe River there is some very good land on the benches, with a heavier growth of timber. This is as good as could be found anywhere and continues down the Canoe River for some miles. A large bench to the north side of Swift Creek is under application to purchase.

There is a width of 5 miles east and west across the valley just south of Cranberry Lake. I surveyed most of the available land north of the Canoe, using the north bank of that river, which is 2 chains wide, as a boundary, but there is a large block on the other side and south-easterly down the valley not touched.

Following instructions, in the middle of July I took some horses and a few men on a trip of inspection as far as Hughallan River (formerly known as Goat River), some 45 miles from Cranberry Lake, down the Canoe. There is a sort of trail from the Cache all the way down the east side of the Canoe to the Columbia River, and thence to Golden, on the north and east bank of the Columbia. The Canoe end of this trail is in bad shape and we had a lot of trouble with bogged horses: one beast wasted half a day, falling into the river bodily and refusing to either get out or be got out.

About half-way between Cranberry Lake and Hughallan River is a log-jam, and there are hot springs close by. One of the Kamloops old-timers who suffers from rheumatism has built himself a cabin here and a bath-house. He has dug out a good-sized hole and roofed it in, and you can sit up to the neck in water, which is almost unbearably hot. As the water does not smell like rotten eggs, there may not be so much virtue in this as in other known pools of like sort, but as a result of the onward march of civilization, as typified in the Grand Trunk Pacific construction camps, already small bands of pilgrims have visited the shrine to be boiled out. There are other springs within a few yards that are much too hot to hold your hand in. These all occur at the edge of one of the most beautiful little lakes imaginable where every prospect pleases.

The river above this point is extraordinarily crooked. On both side of the valley is a range of high mountains, growing higher and more rugged as one goes south, but there are probably 10,000 acres of unsurveyed land between the log-jam and my surveys at Cranberry Lake. This takes into account the benches fit for settlement. The soil gets better toward the south and has a good deal of fir. When near the log-jam first-class cedar is encountered, which is, however, taken up. This valley is very well watered. Several large creeks come in from the east, but no irrigation would be necessary below the log-jam, for the country there assumes the heavily-timbered characteristics of the Revelstoke and Big Bend sections. Below Hughallan River the Canoe is only navigable for expert boatmen, and the less said about the navigability of the Columbia the better. There may possibly be 9,000 acres of agricultural land between Hughallan River and the log-jam, including one fine meadow of 120 acres. The valley averages nearly a mile in width. Down here there is less liability to summer frost, and there is much more rain than on the Cranberry Lake Plateau. The trail is probably an old Indian one travelled two or three times a year by trappers. At present this is about as inaccessible a spot as could be found in British Columbia on the same latitude. We saw only two men on this trip; one of them, the best boatman on the Columbia, was drowned in Surprise Rapids shortly afterwards.

Camp Creek rises in the mountains west of Albreda Lake, and when it reaches the valley at the summit it turns north and joins the Canoe a little east of the Canadian Northern Railway crossing. It does not average a chain in width and is full of mica at high water. The valley tapers from a mile in width at the Canoe to half a mile at the summit, a distance of 12 miles. The land rises in jack-pine benches on the east side, one of which is but 2 miles wide measured from the Canoe, and runs across to the valley of that river where it turns from an easterly to a southerly direction. On this bench is good timber, some of which has been staked, running high up the flanks of the Canoe Mountain. On the west side of the valley is better timber, cedar, fir, and spruce, and this belt crosses the floor of the valley 2 miles north of Albreda Lake. There are also some good hay meadows along Camp Creek and several creeks flow in from the west. Beyond this timber-belt and on the summit the valley is a willow bottom, which extends to Albreda Lake. Some of this has been taken up by Mr. Fry, who has built a cabin and has twenty head of stock. His garden was a gold-mine this year, for he charged us 10 cents a pound for vegetables.

The lake, by the way, is a hay meadow which the beavers have dammed. When we first saw it it was a hay meadow and when we came back it was a lake. By continually breaking dams Mr. Fry managed to cut a quantity of wild hay.

The Albreda River is 17 miles long from its source in Albreda to its confluence with the North Thompson. The valley averages about half a mile in width. At the crossing of the Kamloops Trail, 8 miles below the summit, the river is nearly a chain wide, and at this point, from where can be seen a magnificent glacier to the south, the valley turns from south-east to south-west. The soil is a good clay loam and there are numerous hay meadows strung along the valley.

From the lake the timber is burnt out for the first 4 miles south; after this, one finds a dense cedar, hemlock, and spruce forest, with devil's-club exactly like the Coast. The cedar, however, though sometimes very large, is generally hollow. There must be a heavy precipitation here. The line of demarcation between this valley and the Cranberry Lake Plateau is sharply defined and the difference very noticeable. On the one side there are dense cedar forests with rich clay loam, and on the other jack-pine and poplar with light sandy soil. There are two large tributaries—the East Fork, which enters about 2 miles north of the crossing, and Raft Creek, which comes in from the west 2 miles below the crossing. It is a much larger stream

than Camp Creek where it enters the Thompson. There are huge snow-capped mountains on both sides of the valley, with timber growing far up their sides, and many small streams coming from the ice and snow that never goes away. This will be a rich valley when the timber is taken off and the land open for pre-emption.

Settlers are flocking into the country fast. Around Cranberry Lake there are a dozen who have at least built their cabins, and on the Albreda Summit two more have brought their families out and are farming on quite an extensive scale.

Mr. Lindsay, at Cranberry Lake, has built a most ingenious water-wheel for sawmilling purposes, and is now engaged in damming Swift Creek to get head enough to drive a turbine.

No sooner did we complete a quarter-section than it was staked. Speaking of settlers brings one naturally to the question of the suitability of the land for farming. The benches in the vicinity of Cranberry Lake are composed of clay loam and will make first-class farms when it is cleared of the timber, which is much denser than on the flat. The floor of the valley is undeniably sandy, though the subsoil is clay and holds water better than it would appear to do, and I think that there is no question as to the necessity for irrigation. There is abundance of water, however, for that purpose. There are four creeks between Tete Jaune and the lake. The largest of these and the most accessible to the largest area of irrigable land is Swift Creek, about 1 mile north of the lake. It rises not far from Moose Lake, in the Yellowhead Pass. At high water and at the highest time of day there are 540 cubic feet per second available in this creek, and it is, of course, during high water that irrigation is most needed. The other three creeks discharge perhaps 100 cubic seconds between them.

If we say that irrigation is needed between the beginning of May and the end of August, and call the average flow of these four streams 200 cubic seconds during those months, which I think is well under the mark, and if, taking into account the sandy nature of the soil and its newness, we say that the duty of one cubic second in this particular instance is only 60 acres, we should still be able to irrigate 12,000 acres. On the west side of the valley is Mica Creek, which is but little smaller than Swift Creek, and would take care of another 8,000 acres. So there is all the water needed to irrigate any land that is fit for settlement along the McLennan. I am speaking of the land I myself surveyed and not of the more sandy stretch nearer the Cache. Swift Creek, as far as I explored it, has no abrupt falls, but there is a difference of elevation of 300 feet on the 5 miles immediately before it enters the flat which would make it available for power purposes.

The summer of 1912 was a difficult one to generalize from. The first week in June was bright and cold. On the fourth of that month we had 16° of frost, but between June 15th and September 13th there was no frost at all. Supposing this to be the record of an average year, you would have three clear months of the finest growing weather, for in that latitude the days are very long in summer. Nothing much grew until the beginning of July, but after that what crops were in at this early stage in the development of the country went ahead very fast. Witness a garden that was put in on breaking Teepee Creek, and amongst all sorts of other garden-truck, produced a turnip that weighed 17 lb., which is pretty good under the circumstances. The middle of June was very dry and the whole country seemed to be on fire. It was difficult to see a back picket 5 chains away, and the heat was more oppressive than anything I can remember anywhere, and that includes heat in Aden, Zanzibar, and Spences Bridge. I do not know what the thermometer did, and it may have been the smoke that made the heat so oppressive. Toward the end of the month this heat-wave broke up in thunder-storms and we had nothing much but rain thereafter. From all accounts it was the wettest summer ever known in that part of the world, though I think the oldest old-timer has only been in the valley twenty years. From what we could see of the Albreda in the distance, and experienced when there later on, it seldom stopped raining there during the remainder of the season.

When we reached the McLennan at the end of May, all sign of winter had disappeared and vegetation was well forward. In June daylight extends from 3 a.m. to 9.30 p.m., the nights being always cool. From our experience snow may be expected at the end of October, but there is seldom more than a foot on the Cranberry Lake Plateau at any time, and everybody assured us that in this neighbourhood the winter climate was very fine, really cold snaps not lasting long and the usual weather bright and sunny, with no extreme frosts or wind. On the Albreda there is a heavy fall of snow. From what we could gather the frost is out of the ground well before the end of April, and the winter climate is not nearly so severe as the high

latitude would lead one to expect. Cranberry Lake froze over in the latter part of November, although softer weather, with rain, threatened to break it up again.

In a country where scenery is a drug on the market it may seem foolish to say anything about it; but I know of no grander views than may be obtained in the valley of the Canoe throughout its entire length. It rises in stupendous glaciers among the Mica Mountains, winds like a tortured snake across the wide flats at Cranberry Lake, and then flows for 70 miles between enormous rocky peaks and glaciers that are quite as fine as anything at Rogers Pass or Field. The Albreda Valley is almost as grand, and the Canadian Northern Railway, when completed, will be able to offer an unsurpassed scenic route.

To the sportsman this district offers everything from grizzly bear to willow-grouse. It is pre-eminently a caribou country. While there are plenty of goat, sheep occur only on the main range of the Rockies east of the Canoe. Black bear are fairly common and used to disturb our lunch-sack when left on line overnight. The country has been trapped for some years with unusual success, but there is a large field left in the many side creeks and rivers which are practically unexplored. Late in the season large bull trout were caught in the Albreda and Canoe Rivers.

It is undoubtedly a bad fly country. The bulldogs during hot weather kept the horses thin, and were not above taking large pieces out of mere man. In the swamps and low places the ubiquitous mosquito kept his end up, and the black-flies and sandflies came a little later on to keep things moving.

EXTRACT FROM REPORT OF A. P. AUGUSTINE.

DATED DECEMBER 15TH, 1912.

[Mr. Augustine was employed in 1912 by the British Columbia Government making surveys on the South Fork of the Fraser River in the vicinity of Goat River.]

The valley varies in width from 1 to 2 miles above Tete Jaune Cache to 5 and 6 miles at Goat River, about 60 miles below the Cache. The general course of the river is north-west. In general there is a flat of from 2 to 10 feet above high-water mark, about three-quarters of a mile wide, along the river. This flat is in most cases a sandy loam, although in a few instances I found it to be a clay loam. Back of the flat is bench land and gentle slopes rising at about 3° to 5° up to the foot of the mountain to an elevation of 3,000 to 3,200 feet, while the flats are at an elevation of about 2,200 feet. The bench land is in most cases of good clay loam, although in places it is gumbo, with very little soil on top. This heavy clay might be turned to commercial use in the manufacture of brick and tile. In many cases from the foot of the mountain up to the timber-line the soil is good, and if properly seeded would develop into excellent grazing land.

Scattered over the country, both on the flats and the bench land, are beaver meadows from 5 to 15 chains wide and from 20 chains to 1½ miles long. From the growth of scattered timber on some of these, I would judge some to be forty or fifty years old, while others are newly built with beaver at work on them at the present time. All these beaver meadows are easily drained by breaking down the dams and running a few open ditches, and while the older parts are comparatively easily cleared, the newer meadows require practically no clearing at all. The soil of these meadows is a black muck, which would grow anything, but are more especially adapted to raising vegetables, as the land is so strong that grains are apt to grow too rank a stock.

Old inhabitants of the country say that there are usually plenty of wild strawberries, raspberries, huckleberries, and some blueberries and cranberries, but owing to the forest fires there were not so many this year. Still, what I saw of the district convinced me that wild fruits will do well without cultivation. Cultivated fruits would be a great success.

Owing to the reserve there are very few actual settlers in the valley, but there are several "squatters" who have gone in, built shacks, and made garden-plots, thinking by so doing they will hold the land when it is thrown open for settlement. These people, without irrigation, have shown that the country is capable of raising good potatoes, carrots, beets, radishes, onions, lettuce, and such garden-truck. The oats which they planted were never given a chance to ripen, being cut and cured for hay while green. However, an old experienced rancher felt

confident that had he let his crop of oats grow they would have matured and would have averaged 75 bushels per acre.

CLIMATE.

This year there has been plenty of rain for all agricultural purposes. However, old inhabitants of the valley say it was an exceptionally wet season, and in case it should develop that parts of the land need irrigation it would be easily accomplished, as there are numerous good-sized streams with such a fall that all the bench and flat land could be irrigated by gravity.

According to old prospectors and trappers who have spent several years in the valley, the snow is practically all gone by May 1st on the lower levels. When we arrived on June 1st there was no snow left. It is claimed that there is not more than 2 feet of snow on the ground during the winter, and this does not fall till nearly Christmas. The minimum temperature is about 35° F. below zero, and this extreme low temperature lasts only a short period. Fine bright weather prevails throughout the winter months. During June the lowest temperature was 25° F., which occurred on the 5th of the month. After the 10th there was a minimum temperature of 31°. There were no more frosts until the 29th, when the temperature again fell to 31°. The maximum temperature of the month occurred on the 19th and was 89° in the shade. There were eighteen very fine days and but three or four very wet days, with the balance of the month unsettled, showery, cloudy, and some sunshine.

July was much wetter than June—just the reverse to the general rule in that locality, it is claimed. There were fifteen days in the month that it rained more or less; this included three or four sharp electric storms, the minimum temperature for the month being 38° and the maximum being 92° in the shade. August had a minimum temperature of 36° and a maximum of 88° in the shade, with a fair amount of rain. September had a minimum temperature of 14° on the 30th and maximum of 62° on the 14th, and was in general a bleak, cloudy, and rainy month, growing colder with less rain towards the end. It was the 30th of the month before the slush ice began to run in the Fraser. This, with the extreme low water at the time, made it very difficult to navigate scows on the river.

Usually the Fraser begins to freeze between the first and middle of November, but is not frozen sufficient for heavy freighting till about the middle of January; then it is good for from six to eight weeks, but, as is usually the case in teaming on ice, last winter several horses were lost by breaking through—not that the water is deep everywhere on the river, for one could ford it on foot in places, but there are many deep holes.

The evenings during the summer are usually cool, there being only three nights during the whole summer that we felt the heat at all oppressive.

I have never seen fewer mosquitoes in any place in British Columbia, and there were practically no black-flies this season. It was claimed that the paucity of mosquitoes and flies this season was due to the dense smoke from the forest fires.

TIMBER.

As one goes down the valley from a few miles above Tete Jaune Cache he notices a gradual change of timber from light jack-pine and poplar on the lighter soil which prevails in that district to heavy cedar and spruce and hemlock on the heavier soil which prevails toward Goat River. Here the timber is comparable to that of the Coast.

The timber is not first class, for although the trees are of good size, yet in too many cases they are faulty, especially in the cedar. Besides the cedar and spruce there is some hemlock, birch, cottonwood, and a few scattered fir, the most of the latter being tall dead stubs 4 and 5 feet in diameter, solid, save a few inches of dry-rot on the outside.

At present there are no sawmills in the valley other than those operated by the Grand Trunk contractors. There are a number of streams with sufficient fall to develop power for sawmills, as well as many other industries which might be operated in the valley.

MINERALS.

According to prospectors, it is not a highly mineralized country, although within a few miles of Tete Jaune Cache a large amount of mica has been located. This bids fair to become of great commercial value, as it is reputed to vary in size from cubes 2 inches to 18 inches. Besides this, there is an iron-deposit in the same locality; but whether it is large enough to be of any commercial value is yet to be proven. In the Yellowhead Pass are good deposits of coal, which are being worked.

GAME.

The district around Goat River and the Morkill River (formerly known as Little Smoky River) might be termed a sportsman's paradise, there being plenty of moose, caribou, goat, and both black bear and grizzly bear, besides grouse and rabbit. Our meat bill during the past season was materially reduced by the aid of two moose, five goat, and many grouse and rabbits.

Several men who have spent nearly their whole lives in different parts of British Columbia claim that the valley of the South Fork of the Fraser River to be as good as any in British Columbia, and any one taking the trouble to compare the climate, soil, elevation, mineral and timber resources with that of other parts will no doubt come to the same conclusion.

EXTRACT FROM REPORT OF A. J. CAMPBELL.

DATED DECEMBER 18TH, 1912.

[Mr. Campbell was employed in 1912 by the British Columbia Government in locating and surveying the 52nd parallel of latitude, being the southern boundary of the Cariboo District. He commenced near the 141-Mile House on the Cariboo Wagon-road and ran east for 55 miles to the boundary between the Kamloops and Lillooet Districts.]

With regard to a description of the country passed by the 52nd parallel: From the Cariboo Road to the Horsefly Road and Spout Lake (formerly known as Crooked Lake) the line passes through a gently rolling timbered country. In the first few miles large fir were encountered and then ceased, the timber in the last miles being practically all jack-pine, generally of small size and in places very thick. North of the line in this part there are gently rolling belts and bench lands, well timbered with fir and jack-pine. The country is dry and very little water was noticed. Knife Creek and Jones Creek are the largest creeks. Knife Creek flows out of Squawk Lake in a westerly direction not far north of the line, and crosses the Cariboo Road at the 141-Mile House and there joins the San Jose River. Jones Creek flows out of the lake of the same name and joins the San Jose River a few miles above the 150-Mile House. The timber on the whole is small, mostly jack-pine; scattered fir is found up to 30 inches in diameter. The section lying to the south of the line in this part is somewhat different to that of the north, being covered with a heavier growth of timber, fir, some jack-pine and poplar.

A large percentage of this part could be cultivated, but would require irrigation to be made productive. Some good land lies along the valley of the Knife and some a few miles south of the line along the Horsefly Road. Part of the latter is meadow and bench land covered with poplar. The soil generally is a sandy loam more or less strong. There is good grazing all through this section.

From Spout Lake east the line ran through a rougher country. To the south a long range of high hills runs nearly parallel with the line. In the southern part of these hills lies what is known locally as Timothy Mountain, from which the settlers in the vicinity of Lac la Hache cut quantities of hay every year. To the north and east of Spout Lake rise barren rocky hills stretching to the north interspersed with narrow valleys. A few miles east of the lake the land falls gradually to the valley of the headwaters of Canim Creek (formerly known as Eagle Creek), which flows into Canim Lake about 6 miles from its upper or western end. Along this valley, and to the west and running to the north towards Murphy Lake (formerly known as Eagle Lake), which lies about 5 miles north of the line, there is a good stretch of bench and gently rolling land back to the rocky hills already mentioned. North of Murphy Lake the land rises to a range of high mountains. This section is all wooded country, with jack-pine over the greater portion, poplar along the valley and on the bench lands above Murphy Lake: and spruce, balsam, and cedar of good size is found around and to the north of the lake.

Near the 28-Mile post a trappers' trail was found which followed close to the line for about 5 miles, where it joined a trail running north and south. This trail, it was later discovered, ran in a southerly direction for nearly 20 miles until it joined the Canim Lake Wagon-road about 6 miles above the lake. This trail proved of great value in bringing supplies to the party. It ran southerly along a valley containing some good bench land and hay meadows. A noticeable feature of the meadows over the whole country is that they have been flooded by beaver-dams, even the small lakes having been dammed and the water flooded into the timber.

From the headwaters of Canim Creek the line ran over a range of rocky hills to fall again into the narrow valley of Canim Creek. These hills had, for the greater part, been burnt over, and in many parts were covered with a thick growth of young trees, jack-pine predominating, with some fir, spruce, and poplar. Over a large part no new growth had started and the bare rock remains were covered with windfall and scattered standing dry trees.

The line from here to Deception Creek (formerly known as Spanish Creek), near where it turned south, ran over high hills, except where it crossed the valleys of Boss and Marten Creeks. These hills ranged from 3,000 to 4,500 feet above sea-level. Very little of this land could be considered of much value from an agricultural point of view, being generally rocky, rough, and broken. Much of the country is covered with a good growth of timber, spruce, balsam, and cedar, some fir in parts, but jack-pine predominating.

Boss Creek Valley is narrow, with practically no bottom land, and very little bench land in the vicinity of the line. East of Boss Creek lies a large *brulé* covering the range of hills that runs between Boss Creek and Marten Creek. Large standing dry trees and windfall are all that remain of an excellent growth of timber.

Marten Creek Valley has some good stretches of bottom land and bench lands, particularly on the slope rising to the east from the creek. The timber on the east slope is generally small, having been burnt over repeatedly, and consists of poplar, jack-pine, and some small cedar.

The valley of Deception Creek is considerably wider than the valleys of Boss and Marten Creeks. The slope from the west falls steadily for 2 miles or more to the creek-bottom, and a considerable portion of this could be cultivated. The valley becomes narrow a few miles above the line, the slopes rising to high mountains on either side. The country around Deception Creek has all been burnt over and is covered with a growth of young trees; the large timber, principally spruce and balsam, and some cedar, still remains in patches.

There is considerable land suitable for cultivation on the east side of Deception Creek, particularly in that part between Spanish Creek and the point where the south line crossed Deception Creek. Above Spanish Creek there are a number of areas of meadow and bottom land along Deception Creek running for about 2 miles up the creek. A few miles above its outlet into Deception Creek the Spanish Creek Valley widens out and contains some good meadow and bottom land.

Between Deception and Bridge Creeks the country is very hilly, with a steep slope to Bridge Creek, and contains little land of agricultural value. There is good fir on the slope falling to Bridge Creek. Along the south of this creek runs a strip of level bench land about a mile wide to the foot of the steep and rocky mountains. This strip extends from the surveyed land to the south of Canim Lake over to Mahood Lake. The timber south of Bridge Creek is mostly jack-pine, some spruce, poplar, and scattered fir. The soil generally is a light sandy loam, with more or less stone and solid rock outcropping in places.

From Canim Creek Valley to Deception Creek the horse-feed was very poor, practically none in the bush and very little on the meadows, as these were for the most part flooded. In the vicinity of Deception Creek and Canim Lake it was better, particularly around the east end of the lake.

The old Clearwater Trail, after following down the valley of Spanish Creek, crosses Deception about a mile south of the 52nd base-line, then runs in a south-westerly direction to Marten Creek, crossing that about 4 miles below the line. It still follows the same direction, crosses Boss Creek, and comes out on Canim Lake at the mouth of Canim Creek. From there it follows near the shore until it joins the Canim Lake Wagon-road. A branch from this about 2 miles east of Marten Creek runs south to the east end of Canim Lake. There is also a good trail along the south side of Canim Lake. Between Canim and Mahood Lakes is a winter road about 5 to 6 miles long.

From what could be learned from people living in the country, the excessive rainfall during the past season was very exceptional. During July and August electric storms were very common. The temperature through the summer was equable, no very hot weather being experienced and no summer frosts were noted.

On Bridge Creek, about a mile below Canim Lake, there is a fine waterfall about 110 feet high. Below the fall the river runs through a canyon. This will probably be of value for a water-power at some future time. Another minor waterfall was noted on a branch of Canim Creek, which flows into the creek from the north-east a short distance above the line. There is a fall here of 200 feet or more in a mile, but the volume of water is small.

About 3 or 4 miles above the line, in the valley of Deception Creek, and on the west side of the creek, are some mineral claims which are being developed. A number of mineral claims have been staked in this region and around Mahood Lake.

Deer are fairly plentiful in the country passed through. A few caribou and bear were seen. Grouse are very plentiful and in some of the creeks and lakes fine trout were caught.

EXTRACTS FROM REPORT OF J. A. WALKER.

DATED DECEMBER 19TH, 1912.

[Mr. Walker was employed during the months of September, October, and November, 1912, by the British Columbia Government in making surveys on the South Fork of the Fraser River in the vicinity of the Clearwater River (now known as Torpy Creek.)]

With my party I arrived at Torpy Creek from Fort George by steamer on September 1st. Work was immediately proceeded with on the following day. The weather was almost intolerable. Nearly all fall it was cold and wet. This condition seemed to be but a repetition of the summer climate. The precipitation in this particular district seems to be considerably greater than that of the country immediately to the east and west. The temperature also would appear to be somewhat higher. Temperature readings were taken daily, morning, noon, and evening. Minimum and maximum temperatures were not obtainable owing to the lack of a self-recording thermometer. Tables of the readings taken and a condensed weather report are annexed. To our knowledge no summer frosts occurred. About November 1st "frazzle ice" began to run in the river.

On the north side of the Fraser River at the confluence of the Fraser River and Torpy Creek, and their respective valleys, the country is very rough and broken up with small ridges. This is especially noticeable on the west side of Torpy Creek. The soil is loam, with a clay or "gumbo" subsoil. It is, for the most part, well watered with numerous small creeks. The timber here, though considerable of it was damaged by fire, is of cedar, spruce, and balsam. The cedar is very large—up to 72 inches—and is nearly all hollow.

Below Torpy Creek this rough condition of the country continues. The land is very poor. The ridges are higher and the ravines deeper. Rock outcrops in several places in cliff-like formation usually paralleling the Fraser River. The soil is, for the most part, loam on top of clay. The soil is comparatively shallow. The timber in this vicinity, though mostly burned, runs heavily to large dead cedar.

The east and west boundaries of the lots through which Torpy Creek flows follow the top edges of the benches very closely. The soil is a sandy or silty loam. This land is good and is covered with small willow, poplar, and spruce, with occasional clumps of large spruce. About a mile or more up Torpy Creek there are several small meadows and swamps covered with a rank growth of grass. This would make good grazing land, but the area is very limited. East of this for about $1\frac{1}{2}$ miles, and extending for nearly a mile north and south, the land is quite flat. It is covered mostly with spruce and poplar from 8 to 16 inches. It would be easily cleared and would be suitable for agricultural land.

Above Torpy Creek the land, though bench land, is similar to that in the Torpy Valley. It is rolling, but not very rough except in spots. The timber is principally spruce, fir, and cedar. There is a flat strip of land averaging 10 chains in width lying between the bench land and the Fraser River. Fire has not touched this part very much.

On the south side of the Fraser River the land is, for the most part, especially near the river, very rough. About a mile below Torpy Creek the country is burned bare in the fire of last spring.

SOIL.

The soil is a loam with a subsoil of blue clay or "gumbo." It is at this point that the Grand Trunk Pacific Railway contractors are driving a 3,000-foot tunnel. They have made no progress all summer owing to the quicksand nature of the soil arresting their attempts to do so. The low-lying land along the river, generally at the bends of the river, has a good soil of loam, with, as a rule, a subsoil of gravel and clay. This land when cleared will make good agricultural land.

During our operations we saw no indications of any mineral wealth, nor heard of any prospects in that locality.

With the exception of Torpy Creek and Ptarmigan Creek, the creeks are all very small and could not be used in any way to develop water-power. On the waters mentioned we saw no suitable sites to develop power.

GAME.

Game was found to be fairly plentiful. The most important variety of game known in the vicinity is the moose. Caribou, bear, and beaver also abound. Grouse, ducks, and rabbits are also very plentiful. Several varieties of trout are found in the streams. There was a very poor "run" of salmon in the Fraser this year. A game reserve is now placed on the north side of the Fraser on the Torpy and Morkill watersheds.

The Fraser River from Goat River to Torpy Creek passes through a well-timbered country. The timber has been burned in places, though to a comparatively small extent. About 2 miles below Goat River, on the south side of the Fraser River, there is some muskeg country. This muskeg covers an area of probably 3 miles in length by 1 mile wide. About half-way to Torpy Creek there is a considerable area of beaver-swamps. There are many high cut-banks along the river.

TABLE OF TEMPERATURES (FAHRENHEIT).

Date.	6.30 a.m.	12 Noon.	6.30 p.m.	Weather.	Date.	6.30 a.m.	12 Noon.	6.30 p.m.	Weather.
Sept. 1	----	----	----	Rain.	Oct. 9	31	49	42	Overcast and rain all night.
" 2	42	----	----	Overcast.	" 10	38	48	42	Rain in p.m. and all night.
" 3	38	----	----	Overcast and showery.	" 11	37	50	42	Rain in a.m. and overcast.
" 4	38	----	57	Overcast.	" 12	32	55	47	Fair.
" 5	34	----	56	Overcast.	" 13	33	65	57	Fair.
" 6	44	----	57	Overcast. Clear in evening for short while.	" 14	34	60	54	Fair.
" 7	42	65	54	Rain.	" 15	40	56	52	Heavy thunder-storm.
" 8	48	64	57	Heavy rain all day and night.	" 16	35	56	43	Overcast.
" 9	47	66	58	Fair though cloudy.	" 17	43	59	40	Rain all day and night.
" 10	45	71	60	Fair.	" 18	35	56	32	Rain and snow at night.
" 11	40	76	70	Fair.	" 19	30	52	35	Fair.
" 12	43	77	63	Fair.	" 20	29	49	32	Fair.
" 13	39	77	63	Fair.	" 21	32	49	39	Fair.
" 14	37	78	68	Fair.	" 22	39	49	39	Rain in evening.
" 15	34	75	63	Fair.	" 23	33	46	37	Snow in morning.
" 16	36	74	61	Fair.	" 24	29	47	42	Overcast.
" 17	44	69	56	Fair.	" 25	43	48	47	Fair.
" 18	47	69	46	Rained all day.	" 26	43	56	44	Fair.
" 19	46	65	52	Overcast.	" 27	34	57	40	Fair.
" 20	31	65	49	Fair.	" 28	26	49	32	Fair.
" 21	33	63	56	Fair.	" 29	26	44	29	Fair.
" 22	32	62	43	Overcast.	" 30	24	46	32	Fair.
" 23	35	59	45	Overcast. Rained all night.	" 31	26	45	39	Fair.
" 24	33	49	43	Rain all day.	Nov. 1	28	44	35	Fair and overcast.
" 25	39	50	42	Rain all day and night.	" 2	35	41	38	Overcast. Snow at night.
" 26	38	47	45	Overcast.	" 3	38	39	35	Fair.
" 27	41	51	44	Fair.	" 4	35	40	32	Fair.
" 28	32	53	52	Fair. High winds.	" 5	33	42	34	Overcast. Snow at night.
" 29	33	55	52	Overcast. Rain at night.	" 6	36	37	34	Overcast. Snow in afternoon.
" 30	34	54	52	Ditto.	" 7	34	35	34	Snow all day.
Oct. 1	46	50	48	Rain in p.m. and night.	" 8	36	38	37	Snow and wet.
" 2	46	48	47	Rain all day and night.	" 9	32	36	32	Snow.
" 3	42	49	40	Showers.	" 10	25	34	27	Fair.
" 4	43	50	40	Overcast.	" 11	24	32	32	Fair.
" 5	34	51	43	Fair.	" 12	31	----	----	Started for Fort George.
" 6	36	52	46	Overcast.					
" 7	41	47	45	Rain all day.					
" 8	42	50	43	Fair.					

EXTRACTS FROM REPORT OF R. W. HAGGEN.

DATED DECEMBER 21ST, 1912.

[Mr. Haggen was employed in 1912 by the British Columbia Government in making surveys in the vicinity of Prince George and near Bowron River (formerly Bear River) and Quesnel.]

The new surveys I made cover 2,039 acres lying to the north and south of Tsadestsu Creek, on the Willow River Trail, and 19 miles distant from Prince George. Of this distance, a wagon-road is constructed for the first 5 miles, and is to be continued to Willow River. The country is suited for the economical construction of roads, there being no bad hills, no heavy timber, and good bottom.

Along Tsadestsu Creek there is a strip of land 5 to 8 chains in width, open, grassy, and well suited for hay. The soil is a brown loam, several feet in depth, some of the ground being old beaver-dam. This land can be irrigated from Tsadestsu and its tributary creeks. On either side of the creek the land rises 150 to 200 feet to a rolling plateau, broken towards Willow River 2 miles to the east.

On this plateau the soil varies. In some parts it is a clay loam, on which there is a growth of light poplar, with some willow, fairly open and easy to clear. The balance is covered with spruce and jack-pine, moss growing on the surface over hard clay. I think the arable land on this plateau can be cleared at an average cost of \$60 an acre. It appears to be suited for the raising of grain and the hardier vegetables. The danger of summer frosts is undoubtedly the greatest drawback in this country. This summer there were severe frosts during the first week in June, the thermometer reaching 18° F. one night. After June 7th we had no frost, and A. E. Humphrey, B.C.L.S., who was surveying farther up Willow River during the summer, informed me that they had no more frosts. The severity of the early June frosts would logically lead to the assumption that there would be frost to some extent all summer. One surveyer who worked in this locality in 1910 informed me that ice was found on the water-pails in July and August of that year. Under the circumstances it cannot be said that the country is yet free from frost, though undoubtedly there are frequent summers without it, and I think it safe to say that, with the clearing and cultivation of the ground, the soil will maintain enough heat from the long sunny days to preserve the crops from damage. The climate of the Fort George District is very similar to that of parts of the Prairies, and it is only reasonable to assume that the cessation of the frosts there after cultivation of the land will be duplicated in this district.

During the past summer an exhibition was held at Fort George. Mr. J. H. Grisdale, of Ottawa, Director of Experimental Farms, informed me that the vegetables and grains grown in the Fort George District were of very good quality. Vegetables and grain can be grown generally without irrigation, though there are parts where the ground is too dry. On Willow River and between South Fort George and 6-Mile Lake there are several settlers, and all appear well satisfied with the district. On Willow River I tied Lots 2177 and 2738. The land between these lots is broken and no use for agriculture.

In the vicinity of Bowron River (formerly known as Bear River) I connected Lots 6658 and 2763 and 6657 and 2866. The land between the first two lots is an arid jack-pine flat, and between 6657 and 2866 there is a large muskeg which does not appear to be of any use. In June this year there was ice 6 inches below the surface; the previous fall, when I was on it, it was very soft and difficult to cross. The Bowron River in Lot 6658 is about 35 miles by trail from Prince George. The land between Bowron River and Willow River is generally of poor quality, with the exception of some strips near the rivers. It is only about 4 miles across. The divide is low and covered with jack-pine.

Willow River, which rises near Barkerville, and of which Williams Creek, made famous by its rich placer-grounds, is a tributary, has been recently investigated as a power proposition. Mr. G. H. Ferguson, of Ottawa, has examined it this year on behalf of the Conservation Commission, and when his report is in a reliable opinion as to the amount of power to be obtained there will be available.

Bowron River also rises in the old Cariboo goldfields, its tributary, Antler Creek, being still a producer. I have made the trip down Bowron River, though not in connection with the Government surveys, and think a few words concerning it may not be out of place. The main Bowron River rises in Bowron Lake, 20 miles northerly from Barkerville. For the first 14 miles it flows through a well-defined valley, with a strip of good land on either side. The valley is grassy,

and wooded with open willow, poplar, and jack-pine. Some settlers have already located on it. After the first 14 miles there is little open country, there being only scattered meadows in the forest. The timber here is practically all spruce not exceeding 15 inches in diameter. A wagon-road and trail run from Barkerville to Bowron Lake, and there is a trail from the lake to a canyon 30 miles down Bowron River. Boats can be used on the river, but there is enough bad water to make it advisable for inexperienced boatmen to keep off the water.

There are two or three small pieces of good land near Spruce Creek, 50 miles from Bowron Lake. From a point below this a low pass extends to Grand Canyon, on the Fraser, the distance across being 10 miles. From Bowron Lake to this point the river has a general direction of N. 10° W.; it now swings almost due west for 12 miles. On this portion of the river are located coal-seams of considerable extent; these have been examined by several well-known engineers, and I understand the reports have been very favourable. A trail has been built this summer from Fort George, 45 miles distant, to this property. There is a little good land at the mouth of Willow Creek, immediately east of the coal lands. This stretch of the river is the best ground I have ever seen for moose and beaver. From Willow Creek to Purden Lake is a distance of only 4 miles, the lake lying 2 miles east of the river and draining into it through Purden Creek. This lake is about 5 miles long.

From Willow Creek the river flows north-westerly 16 miles to Box Canyon. There is some fair land on this stretch of water, but it is all included in purchase claims. The river here is 3 chains in width, 2 to 3 feet in depth, and full of rapids. Box Canyon is 35 miles by the old Grand Trunk Pacific Trail from Prince George. Here the valley opens out and the soil becomes better, though it is rather light, a sandy loam. Along the river there is a dense growth of cotton-wood and red willow. On the benches a good deal has been burned, but some spruce and jack-pine survives the fires and windfalls are plentiful. From Box Canyon to the Fraser the distance is about 25 miles by river and the general direction N. 80° E.

On June 20th the steamer "Chilcotin" made a trip from Fort George to Bowron River, enabling me to take the party up to the Bowron River watershed survey. This watershed was to be located in the vicinity of Lots 4459-4496. I traversed the height of land as far as there was any necessity for so doing. In connection with this survey I made a trail from near the north-west corner of Lot 3108 to Purden (Great Bear) Lake, the distance being about 9 miles. The land along the divide is broken and hilly at the southern end, near Purden Lake, and marshy near the mouth of Bowron River. It is mostly of poor quality. The trail runs nearly a mile to the east of the divide and passes through some good land which had been surveyed prior to my arrival in this locality. I surveyed a section and a half to the south of these surveys. It contains some good flats which can be cleared of their vegetation—poplar, spruce, and jack-pine—at a cost of about \$75 per acre. The soil is a sandy loam. The country here has a good rainfall and appears to be immune from summer frosts. Vegetables and grain should grow well. There are a number of settlers along the river in this locality, but they have all gone in within the last year and have not yet had time to show what the country can produce. The flat land runs back for several miles on either side of the Fraser. It is all wooded, but the spruce, which is dense near the river, gives place to spruce, poplar, and open pine farther back. There are some small meadows on which the growth of red-top and slough grass is good. There are a number of small creeks. Some swamps in this locality can be easily drained, and, as they have a good hard bottom, should make good farms. With the completion of the Grand Trunk Pacific Railway about 6 miles distant from this land, there will undoubtedly be an influx of settlers to this district.

The land between Lots 3101-3095 and 4458-4459 I also surveyed. It is marshy, but can be drained to Bowron River at small cost and will be good hay land. There are two half-sections here. I also surveyed some land at the east end of Purden Lake, on which there is some fair land that will probably be taken up in a few years' time. The ground is mostly hilly, but there is some flat on which the soil is a sandy loam. It is wooded with fir, spruce, and birch. At the extreme east end of the lake there is a muskeg.

This lake has been locally known as Great Bear Lake to the people of Barkerville, and Little Bear Lake to some of the settlers on the Fraser, to distinguish it from Bear Lake at the head of Bear River (now known as Bowron Lake and River). Mr. L. C. Gunn, the Grand Trunk Pacific engineer, informs me that they knew it as Siwash Lake. Bear Lake was the name originally bestowed on it by the Canadian Pacific Railway engineers. Around the north side of the lake there are still traces of the old trail made by the party of Canadian Pacific Railway

surveyors under Mr. H. Purden Bell about the year 1878. Mr. J. H. Gray, the well-known Victoria surveyor, was transit-man on this work. As there are so many Bear Lakes in British Columbia, it seems desirable that a new name should be officially given to this one. There are no Siwashes within a radius of 40 miles: bears are by no means abundant. For that reason I have suggested the official name of Purden Lake, a name which does not conflict, and which preserves the memory of one who was probably the first white man to see the lake.

This lake will, I believe, be a popular pleasure-ground in a few years' time. I know of no other ground in the locality that can compare with it. There is good fishing; the temperature is agreeable for bathing; mosquitoes are not at all numerous; there is good moose-hunting on Bowron River, 6 miles distant; duck-shooting on the muskeg at the east end; good water in the creeks; and a country that is well suited for road-building toward the Fraser. I do not consider the land along the lake, apart from that which I surveyed, to be of any use.

I tied the surveys of Lots 4498 and 6651, also 6649 and 6647. The land along the ties is poor. I also looked at the land between the lake and Grand Canyon, but did not consider it worth surveying.

The Fraser above Giscome Rapids is very sluggish and excellent for navigation. At Grand Canyon there is a stretch of 3 miles of bad water, above which there is a further stretch of sluggish water. This season two steamers were operated by Messrs. Foley, Welch & Stewart between Tete Jaune Cache and Grand Canyon. Three other steamers ran occasionally to Fort George—the "B.C. Express," "Chilcotin," and "Quesnel"—the freight being portaged around the canyon. In previous years both Captain Bonser on the "Nechaco" and Captain Foster on the "Fort Fraser" have taken their steamers through Grand Canyon and almost to Tete Jaune Cache. This winter considerable work is being done to improve navigation here, at Giscome Rapids, and at Indian Gardens, below Prince George. This will make navigation good from the Cache to Soda Creek. This summer there was active construction on the Grand Trunk Pacific above Grand Canyon. Below it were several construction camps; but labour was scarce. Several miles of right-of-way had been cleared, however.

On completion of the work in this locality I came to Prince George, where I received instructions to proceed to Quesnel and make certain corrections and new surveys in that locality. The first work was the correction of some surveys in the vicinity of Dragon Lake, $3\frac{1}{2}$ miles east of Quesnel, and the survey of all the unsurveyed land there and on the Quesnel River up to the canyon. Dragon Lake lies on a plateau 400 feet above the town of Quesnel and good roads run to the north and south ends. The road from Quesnel to Hydraulic, at present under construction, runs around the north end. This road is the best I have seen in Cariboo and is now complete to a short distance beyond the lake.

The land between Dragon Lake and the Fraser is mostly flat; the soil is a deep clay loam, generally free from stones, and productive where it has been cultivated. There is no timber with the exception of a little fir; the land is mostly covered with a fairly dense growth of poplar and spruce and is brushy. However, the trees are small and the usual contract price for clearing is about \$60 per acre. To the east a high hill rises, affording some sub-irrigation to the land near its base. Grain, potatoes, and other vegetables grow well without irrigation on this flat, which is practically all arable. Irrigation is usually necessary for the raising of timothy and alfalfa for hay. This flat is about 14 miles long and has an average width of 3 miles.

Summer frosts, while not unknown, are neither frequent nor severe, and will undoubtedly disappear entirely as the land comes into cultivation. There are still a few unalienated pieces of land on this flat. Water can be obtained from wells and from some small creeks.

Several pre-emptors are residing on their places and already raising a fair amount of produce. Others have apparently taken up the pre-emptions purely as speculations, and some have done no work at all on their holdings. What the Quesnel District wants, and what the whole of the Upper Cariboo wants, is the pre-emptor who wants to be a farmer, the man who is not afraid to work and clear his land. That man is the best asset any country can have, and he, in return, can get a pre-emption with an average of 120 acres of arable land to each 160. This is high in British Columbia. A very few years will see the Pacific Great Eastern Railway built and it will provide the Cariboo with cheap transportation. I can see no reason why this district should not produce as good wheat, oats, and potatoes as the Prairies. The farmers will have the advantage of a shorter haul to the ocean than the Prairie Provinces can ever have, and Cariboo potatoes will, I think, be as popular in the Coast cities as Ashcroft potatoes

are to-day. A good market for this district is springing up in the rapid growth of the Coast cities. Quesnel will be about 360 miles distant from Vancouver by rail.

I had an opportunity to see what this district could produce at the Quesnel Exhibition held this year. As this was arranged in six weeks, and the prizes were for the most part merely diplomas, the articles exhibited were taken from the regular crops and not raised especially for exhibition purposes. A prize for the best exhibit of produce raised by a *bona-fide* pre-emptor was won by Mr. Paul Zschiedritch, of Kersley. His vegetables took individual prizes in the different classes. The interesting part about his exhibit was that it was grown on jack-pine land, which is usually considered worthless for farming purposes. The whole exhibition was a surprise to me, as the grain and vegetables appeared to be as good as those I have seen exhibited in New Westminster, Kamloops, and Kootenay. Mr. Thos. Cunningham, Provincial Fruit Inspector, and Mr. Grisdale attended to the exhibition, the former acting as judge. Both gentlemen spoke well of the exhibits. The people of Quesnel have long considered the surrounding land to be of very little value, and, indeed, with the limited market yet available, it would be easy to cause an overproduction in certain lines. However, the advent of the railway will open up new markets, and I personally feel sure that the Cariboo will justify the faith that many have in it.

I surveyed the land on the west side of the Fraser River and adjacent to it, between Quesnel and Narcosli Creek (formerly known as Deep Creek), 14 miles down-river. There are a few good pre-emptions still vacant down there. At Narcosli Creek three pre-emptors have their places partly cultivated and are raising good crops. Narcosli Creek, which rises west of Fort Alexandra, is a large creek in a deep valley. A measurement of the discharge, which I made in October, showed 60 cubic feet per second, and there would probably be at least three times this in midsummer. In the early days this creek was flumed to within 5 miles of Quesnel and used for placer-work. There is considerable fall to the creek, and I have heard of a canyon 200 feet deep 3 miles from the mouth, so it could be used for small power-development. However, the use I see for the water is the irrigating of the lands along the Fraser River, which would be excellent for hay-raising. A road from Quesnel to Fort Alexandra runs through the land surveyed.

EXTRACT FROM REPORT OF D. B. MORKILL.

DATED DECEMBER 28TH, 1912.

[Mr. Morkill was employed in 1912 by the British Columbia Government making surveys on the South Fork of the Fraser River, between Horsey Creek and Holmes River (formerly known as Beaver River).]

This portion of the Fraser Valley lies at a mean altitude of 2,350 feet above sea-level, has a breadth of from 3 to 4 miles, and an even north-west trend. The river is from 400 to 600 feet in width at high-water, has a current of from 2 to 3 miles per hour, and follows a winding course, its length about doubling that of the valley.

The granite mountains on either side of the valley rise in steep even slopes from practically level bench land to a height of from 4,000 to 6,000 feet above the river—timber-line being about 3,000 feet above it, and the summits being in many cases grassy plateaus. The valley-floor is approximately half bench and half bottom land. The bench is from 50 to 150 feet above the river-level.

Of the tributary streams, the Rauish is the only one having a valley of any extent. This is from half a mile to a mile wide, but not fit for cultivation and containing little timber.

CLIMATE.

Information gathered from residents in the district during the past four years is as follows:—

Summer temperature, maximum 85° F.; occasional light frosts.

High water, June 15th.

Low water, December 1st.

Plant garden-truck, May 15th.

Rainfall, estimate 30 inches; no data.

First snow, November 1st.

Snow stays, December 1st.

River freezes, December 1st.

River freezes for freighting, January 1st.

Average snow, 18 to 24 inches.

Winter temperature ranges from 20° above to 10° below.

Extreme winter temperature, -30° to -40°.

Duration, extreme, 10 days to 2 weeks.

Ice goes out, March 15th.

The work done during the past season extended from June 1st to December 1st, and records kept during that time are tabulated as follows:—

Month.	Hours of Sunshine.	Days on which Rain fell.	Max. Temp.	Min. Temp.	Mean High Temp.	Mean Low Temp.
June.....	224	7	86	20	69	38
July.....	164	14	85	36	70	45
August.....	175	15	80	36	65	44
September.....	183	5	....	....	....	....
October.....	98	13	....	....	....	....
November.....	55	5	....	....	....	....

Frost was recorded during the first week in June and next on September 4th. Residents state that the past season has been unusually wet for the district. Highest water was recorded on June 27th and 28th. Snow fell in October on the 16th, 17th, and 18th, and in November on the 2nd, 6th, 17th, and 29th, but disappeared in each instance except the last mentioned. The lowest temperature recorded up to December 6th was 20° above zero.

TIMBER.

The valley has evidently been covered at one time with a heavy stand of spruce and cedar timber, much of which, through the portion covered by this survey, was destroyed by fire about eighty years ago. Patches of it still remain.

There is a considerable stand of cottonwood and second-growth pine, spruce, cedar, fir, and birch in patches throughout the survey, the greater portion lying at either end of the work and sufficient for all purposes of the settler. Where not thus timbered the land is covered with a growth of poplar, alder, and jack-pine on the benches, and with cottonwood, willow, birch, and alder in the bottom land. A growth of peavine and vetches was noted where in old burnings the soil had been fully exposed to the sun.

SOIL.

The subsoil is clay, with top soil varying through loam, clay loam, sandy loam, and clay, more or less mixed with silt in the bottom land and becoming sandy on portions of the bench. There are a number of hay meadows scattered through the block.

As a whole, the district is well suited to mixed farming, and such effort as has been made in raising hay, grain, and garden-truck has given very satisfactory results. The survey camp was supplied with potatoes, turnips, beets, parsnips, and onions grown in the district, all of which were found to be equal to any grown in other parts of the Province.

At Horsey Creek this summer T. A. Wilson, W. G. Wright, and Andrew Swanson had good success with potatoes, parsnips, beets, lettuce, radishes, onions, peas, cabbage, and rhubarb, and a fine crop of timothy and oats. At Halliday Creek (formerly known as Baker Creek) W. Sweeney and W. Holliday had equal success with garden-truck which they put in as an experiment, and with a patch of barley. The two latter built a water-wheel on the river and during the month of June irrigated their garden. This was a dry month.

It is probable that the drier portions of the land will need irrigation in some seasons to obtain best results, but owing to the proximity of the mountains and the numerous streams from them there will be an abundance of water available if required.

Horses do well in the district and it should be an excellent one for cattle and other live stock.

Large and small game is plentiful, moose, caribou, goat, and birds, with trout in the river and creeks.

The general formation of the district is granite and mica-schist. The mica is noticed all through this section, fine particles showing in the river-silt and valley soil.

The country has been fairly well prospected during the past five years, but no mineral-deposits of note have been discovered, other than mica, of which there have been a number of promising claims staked on Tête Creek (formerly known as Sand Creek). Copper, gold, and galena showings are reported in Yellowhead Pass and the surrounding hills and an occasional showing up the tributary streams of the Fraser.

EXTRACT FROM REPORT OF P. A. LANDRY.

DATED DECEMBER 30TH, 1912.

[Mr. Landry was employed in 1912 by the British Columbia Government in making surveys on the Chilako River (formerly known as Mud River).]

Chilako River rises in Totuk Lake and empties into the Nechako River 7 miles west of Prince George. This river is about 70 miles long. The valley proper is not of very great width. I consider the Chilako River Valley one of the most fertile, if not the most fertile valley in the Northern Interior. The main river itself is a shallow sluggish stream and even in high water is not over 5 feet deep. The mean average width is less than a chain. This water becomes warm in summer and is not of the best quality. All the creeks flowing into the Chilako River contain water of the very best quality for drinking purposes. Owing to the many log-jams the river is not navigable. By panning the gravel in the river a few colours can always be found.

The river-bottom seems to consist of black loam with clay subsoil, and in a few places of a sandy loam with clay subsoil. Very little, if any, gravel is seen on the bottom. On the upper flats the soil is mainly sandy loam with a sandy-clay subsoil. Gravel was found in places in quite a number of sections.

On the east side of the river there is a general rise of one bench after another until a height of about 200 feet is reached. The country is rough and broken and is, as staked, a timber-limit country. The west side of the river is much more level and the flats do not rise more than 100 feet above the river. Five or six miles to the west of the river a chain of hills or mountains seems to rise rapidly. A great many *brûlés* are to be found on the west side of the river. There is some extremely good land to the west of where we finished our season's work.

The rainfall in the Chilako River Valley is sufficiently heavy. Hardly a day passed without one or two showers, either in the daytime or at night. At no time was the soil what might be called dry; in fact, the Chilako River Valley is the section in Fort George District with the greatest rainfall.

The maximum depth of snow on the Chilako River will reach 4 feet in midwinter. Winter commences in November and lasts until the middle of April.

Summer frosts are still to be found in the Chilako River Valley, though the settlers report that these are fast disappearing. In our own camp we had a frost at the end of June and again in September.

Very little rock in place was found. No possibility of stone-quarries and no trace of minerals.

Deer, black bear, ducks, geese, partridges, and rabbits were the game seen in the country.

No water-power or any chance of developing power was noticed.

At present there are about a dozen *bona-fide* settlers in the valley near where we surveyed. Mr. Cunningham, of the Chilako Plantations Company, has done the most work. I believe that by this time he has ploughed about 70 acres of land. Andrew Miller and John Tutlis have several acres ploughed on each of their pre-emptions. Mr. Dodd has done considerable work on his pre-emption. Close and Brown, on the Bedeker Place, have cleared from 30 to 40 acres at considerable expense.

On the land of the Chilako Plantations Company the crop of oats was very good. M. C. Burr raised a splendid crop of potatoes on his pre-emption. The ground was simply harrowed, the

seed planted and covered up, and the results were surprising, considering the little work done. Andrew Miller had a very good crop of potatoes, garden-truck, and oats. Dodd's garden on his pre-emption would have been a credit to any small rancher working under the most advantageous circumstances.

The Chilako River Valley was visited this summer by three disastrous fires. A great portion of the timber was badly burnt. Fires hindered us in our work during June, July, and August, as we were obliged to work over the ground when it was still smouldering. At times the smoke was very dense and hindered the instrument-work. One, at least, of the fires came from the river, and the others seem to have travelled from the Nechako eastward.

On the west side of the Chilako River the timber is not very heavy, consisting mostly of light polar and jack-pine, although in places there is some heavy fir and spruce. On the east side of the river the timber is very heavy, consisting of large spruce and fir, although in places there is jack-pine and poplar.

EXTRACTS FROM REPORT OF W. S. DREWRY.

DATED DECEMBER 31ST, 1912.

[Mr. Drewry was employed in 1912 by the British Columbia Government in making surveys in the Cariboo and Lillooet Districts in the neighbourhood of the 52nd parallel of latitude.]

Owing to lack of convenient transportation facilities, the region as a whole has in the past been primarily a grazing and dairying country; but there are considerable areas suitable to mixed farming, since, except on the higher portions of the plateau, wheat, oats, and ordinary garden vegetables are successfully grown. Excellent sweet corn—"roasting ears," as described by the new settler from whom they were obtained—was grown on the plateau south of Kersley at an elevation of 2,100 feet above the sea. Some of the finest potatoes I have ever seen, grown at an elevation of about 2,500 feet, were purchased at 141-Mile House, in the San Jose Valley. Potatoes, carrots, onions, radishes, and lettuce of good growth and excellent quality were obtained at Canim Lake, about 2,500 feet above the sea. All the garden produce above mentioned was stated to have been grown without irrigation, as were some fine fields of oats on McNeill's ranch, south of Canim Lake, which is just south of the Cariboo District.

While, as stated, there appear to be considerable areas suitable to mixed farming, a large percentage of the whole seems to be grazing country and timber reserves. The grazing area is not confined to the open country, but embraces a large acreage covered with forests of fine fir, under cover of which bunch-grass, peavine, etc., grow. Excellent summer pasturage therefore abounds, while hay meadows are fairly plentiful, and are strategic points commanding the summer pasture, which must be supplemented in winter by hay cut upon the meadows.

The San Jose Valley lands seem to be eminently suited to dairying, while the higher, rougher hill portions appear to afford good range for cattle.

From questioning those engaged in cattle-raising, it appears advisable to put up about 1 ton of wild hay for each head of stock to ensure against undue loss in winter, particularly toward spring, when alternate thawing and freezing forms a crust which cattle cannot break through to reach the grass underneath. Some ranchers do not think it necessary to put up over ½ ton of hay per animal; but this would seem to possibly be taking an unwarranted and unprofitable risk.

The general concensus of opinion gathered was that each head of cattle requires about 10 acres of range for sustenance; because bunch-grass and peavine, if grazed too closely, gradually disappear through insufficient seeding taking place. Judging from information gained in the Alberta foot-hills during the days of large cattle-ranches, it is thought that the acreage deemed requisite is about right.

It was also generally claimed that pre-emptions of 160 acres are much too small in dairying and cattle-raising districts. There would appear to be some reason in this, since, while 160 or even 40 acres might be ample where fruit-growing or similar concentrated effort is required, when most of the land is used for pasture, a much larger acreage may be necessary to conduct operations in a profitable way.

EXTRACTS FROM REPORT OF R. W. HAGGEN.

DATED NOVEMBER 1ST, 1913.

[Mr. Haggen was employed in 1913 by the British Columbia Government in making surveys on the west side of the Fraser River between the 52nd parallel of latitude and Quesnel.]

I believe that there is a bright future for agriculture in the whole district from Meldrum Creek to Quesnel, as the quality of the soil is good, and a considerable area can be irrigated by utilizing, at considerable expense, Meldrum, Mackin, Baker, and Narcosli Creeks, on the west side of the Fraser. While there has been comparatively little farming done yet without irrigation, it has been demonstrated that wheat, oats, potatoes, and other vegetables grow exceedingly well without water, and even without the application of scientific dry-farming principles. At Soda Creek, and on the east side of the Fraser between that point and Alexandria, is grown the only fruit in the district, although excellent winter apples have been grown at the Australian Ranch. However, the fruit industry will never become an important one in the district owing to the limited area of suitable land. Quantity, not quality, is what will be lacking. Small fruits such as currants, gooseberries, raspberries, and strawberries grow well. The wild fruits found in the district are saskatoons, blueberries, raspberries, and strawberries. Corn, cucumbers, and tomatoes grow well, though the last cannot be ripened as a rule. Of vegetables, potatoes flourish the best and will be exportable as soon as railway transportation is available. Onions, carrots, parsnips, beets, turnips, pumpkins, squash, and marrows grow well. Hard and soft wheat, oats, rye, and barley thrive without irrigation. Where water is available the farmers devote their attention chiefly to the raising of timothy-hay, clover, and alfalfa. Sheep do well wherever they are kept.

COST OF CLEARING.

The cost of clearing and ploughing the land varies from \$25 per acre for the more open country to \$70 for that on which there is a fairly heavy growth. An average of \$60 will be fairly close.

CLIMATE.

The past season was an exceptionally wet one, there being heavy rain on twenty-two days, showers on thirty-two days, and snow, turning to rain, on four other days, during the period of May 17th to October 27th. There were seventy-three sunny days. The only frosts recorded were on two nights in May, at Leach Lake, 6° each time, and four nights in September, at the Fraser River level, 3° and 4° being the extent registered. During October a temperature of 11° was recorded, with frost practically every night. From June 1st to September 10th no frost was recorded. There were high winds on seventeen days. During June, July, and August there were numerous thunder-storms of no great severity.

The summer in this district is generally considered to last from the middle of May until the middle of September. There is always some frost in May and a June frost is always expected. During the past season, it is considered, about twice the usual amount of rain fell. However, the growing weather up to June 20th was exceptionally dry, there being no rain of any consequence. After June 20th there was rain for three weeks, but it was followed by a hot spell of ten days' duration, which enabled the haying to be done. For the balance of the season the weather was unsettled. At times during the season the Cariboo Road was too muddy for the maintenance of a regular automobile service.

As a general rule, the first snow comes about the first of November, but there is not usually sufficient for good sleighing before the middle of December. The snow lies on the ground till the middle of March. During January and February there is usually an average depth of 15 to 20 inches. The usual weather in winter is clear and calm, with low temperatures, from 26° to 30° of frost. The usual extreme low temperature is 50° below zero. There are generally two or three blizzards during the winter.

Leach Lake, where the first camp was made, is a pond of 7 acres in Section 22, Township 49, one of the regular camping grounds of cattlemen on the trail. From here I ran in a chain of four half sections east of the existing surveys, to include the balance of the open land not included in the previous Chilcotin surveys.



FREIGHTING ON THE CARIBOO ROAD BEFORE THE ADVENT OF THE MOTOR-CAR.



RASMUSSEN'S RANCH, NAITESBY LAKE, 1914.

This land is covered with bunch-grass. There is some pine and fir, interspersed with clumps of aspen. As is most of the land on the Chilcotin plains in this vicinity, the area is stony, and, apart from small ponds of unsavory taste, there is no water. I am not in a position to know whether the land will prove good for settlement, but as dry-farming is carried out successfully on similar land on Springhouse Prairie, it should be successful here. There are frequent summer frosts, but rarely more than 2° or 4°. Mr. Becher, of Riske Creek, 12 miles south-west, informs me that he cannot grow good potatoes, though the Indians on the rancherie near by raise them successfully. Hardy vegetables and grain do quite well. Hay will not thrive without irrigation.

CATTLE-RAISING.

On the whole, though crops can undoubtedly be produced by hard-working farmers, I think the Chilcotin is primarily suited for cattle-raising. The land is good for summer range and is generally considered to carry about seventy-five head of cattle per section. Luxuriant hay can be grown where water for irrigation is available, and also on the numerous hay meadows to the north and west. At the present price of beef, with its constant tendency to increase, the small cattle-rancher should do well.

CHIMNEY CREEK FERRY.

Near Leach Lake, 28 miles from Soda Creek and 12 from Riske Creek, a branch road leads to the Fraser River to the old site of the Chimney Creek ferry, used prior to the erection of the bridge across the Fraser at Sheep Creek, 6 miles below. This ferry, which consisted of nothing more than a rowboat at the foot of Chimney Creek Canyon, did service for many years. It offered interesting possibilities of excitement to those who had vehicles and horses to cross.

SODA CREEK-CHILCOTIN ROAD.

The old road descends a hill from the plateau for 1,000 feet to a flat on which I surveyed a 320-acre lot, to include a pre-emption and the balance of the land that appeared likely to attract the settler. Along the road on the hillside I made a cruise of the timber and found it to run about 4,000 feet of fir to the acre. On the flat there is a good growth of bunch-grass and the soil is a sandy loam. Over the greater part of it there is an open growth of fir, with some poplar. A small creek south of the lot provides sufficient water for domestic purposes. This lot, 6047, should be good for dry-farming and produce vegetables and grain. Between this lot and the river, at 600 feet lower altitude, another lot, 6048, was surveyed to include a pre-emption at the old site of the ferry. The two lots are similar as regards soil, but 6048 is more open and hilly. Hardy apples should grow near the river. The pre-emptor had a small crop of oats sown, but it did not look very promising. This lot lies at the mouth of Chimney Creek Canyon, on the Fraser.

A traverse of the river between this lot and the 52nd parallel was made. Apart from a few narrow rocky benches, the land between this part of the river and the plateau is all steep hillside, 1,500 to 1,700 feet high. There is some fir on it and considerable bunch-grass. In places it is sheer precipice.

From Lot 6047 a traverse of the river was run northerly to Meldrum Creek, to connect with the surveys there. Points on the east side of the river were also tied in. The river here is only about 175 yards wide, flowing between steep clay cut-banks.

MELDRUM CREEK VALLEY.

In the Meldrum Creek Valley I filled between the existing surveys. Of the two pre-emptions there, only one was occupied, the resident being an old settler with a large family. Only about 8 acres is cultivated on the land held. The system of irrigation used is the carrying of pails of water from the creek to the crop by the large family.

Meldrum Creek, which has a content of about 8 cubic feet per second in the irrigating season, flows in a narrow valley, which widens out in Lots 1915 and 152 and extends to a bench toward the north. This bench is 1,000 feet above the Fraser River. The largest ranch is held by C. E. Richards, who grows annually about 120 tons of hay and some produce. He uses the water from Meldrum Creek for irrigating; however, there is considerable water going to waste at present. There are three smaller ranches in the valley.

The land between Lot 1910 and the Fraser I did not survey, considering it too broken to be of use. However, a pre-emptor has since located on it. The pre-emptor and the surveyor do not always agree on what constitutes suitable farming land.

There are ten parcels of land between Meldrum Creek and Lot 711 that I consider suitable for settlement. The surface is rolling, falling towards the east, fairly open, and covered with bunch-grass. What timber there is consists of fir on the steeper slopes. As grass grows so well, it is reasonable to assume that grain and vegetables could be raised successfully by dry-farming methods. Water, even for domestic purposes, will be difficult to get on the ground, unless it is brought from Meldrum Creek, or two springs in Lot 711. There is no summer frost on this land, nor, indeed, anywhere along the benches of the Fraser between here and Alexandria. The frost-belt is practically confined to the plateau of the Chilcotin and its northerly extension. From Hawks Creek, 3 miles below Soda Creek, to Chimney Creek, a distance of 22 miles, the river is bounded on either side by clay cut-banks, 500 to 700 feet in height. There are very few breaks in this line of cliff.

COPELAND FLAT.

At Copeland Flat, 5 miles north of Meldrum Creek, the bench gives way, for a distance of 4 miles, to an open, grassy side-hill, dry, but good for pasture. There is one small creek on this stretch. Three miles south of Buckskin Creek the bench recommences. On Copeland Flat the best 320 acres are included in the alienated Lots 711 to 712. Unfortunately the owner makes no use of these lots, though they have the makings of a good ranch, with water available for the irrigation of some 20 acres. Doubtless dry-farming would bring good results from the land. The soil is a clay loam. On the bench, from 3 miles south of Buckskin Creek, there are several good pieces of land. This bench extends to a point slightly above Soda Creek, a distance of about 8 miles. At the time this bench was surveyed six pre-emptors were occupying holdings here, while several holders of records were not to be found. These I reported for non-fulfilment of their duties. There are twelve of the unalienated pieces that I considered suitable for settlement, but I understand that most of these have been taken up since the survey. There is water for irrigation of considerable land in Buckskin Creek. This is partly used by John Malone, who has a pre-emption fast developing into a ranch, immediately south of the creek. More water can be obtained by storing in Buckskin Lake, at the head of the creek.

A small spring is piped for domestic use on Lot 6059. Another small creek, from a hay meadow on the plateau, enters Lot 6083; there is also a small spring on Lot 6085. On the balance of the flat there is no water, though doubtless sufficient for domestic use could be obtained from wells on the lots near the base of the hill. I have heard it stated that ample water for irrigation could be obtained by diverting Mackin Creek, in the vicinity of Lot 103, through natural channels to this land. If this is feasible the whole flat could be irrigated. However, from a casual observation, I doubt if this scheme is practicable, though it is doubtless worth investigation. By the construction of some 8 miles of flume the creek could be brought from a lower point in its course, around a side-hill and on to this flat.

The soil on this bench is loam, clay or sand predominating in different places. There is plenty of bunch-grass. The timber is mostly fir, with patches of poplar. There are some open pieces. There was only one parcel on which the cruise of timber exceeded 5,000 feet, and then only a slight excess was found. As a rule, there is not over an average of 1,200 feet to the acre.

With irrigation the land would undoubtedly grow hay, grain, and vegetables; probably also hardy fruit. Without irrigation hay cannot be grown profitably, but the other crops should do well.

In Lot 6080, 4 miles by road from Soda Creek, and on the bench, a road ascends a steep hill to the plateau. Along this road several pre-emptions had been taken up, and I surveyed these and the land in the vicinity that appeared likely to attract other settlers. Apart from some small wild-hay meadows, I do not consider the quality of the land would warrant pre-emptors settling here. The land is rocky in most places. Near the break of the hill there is considerable fir, which is replaced to the west by jack-pine and poplar. There is some peavine and considerable pine-grass, affording second-rate summer pasture for stock.

HAY-MEADOWS.

The road on the plateau was originally built by William Adams, ex-M.P.P., in connection with hay meadows owned by him on Lots 102 and 103. These lots are now owned by Yorston Bros. On the meadows some 400 tons of hay is cut annually; it is used for wintering stock. From Lot 270 the road ascends a 1,000-foot hill on a very steep grade. The maximum load that can be hauled by two horses is less than 1,000 lb. From the summit of the hill to the meadows the road is very rough, large rocks protruding everywhere. A branch road runs 4 miles northerly from Long Lake, 1 mile west of the summit, through several pre-emptions.

I traversed this road to tie in Lots 102 and 103, which lie about 3 miles west of the surveys I had made. About 1½ miles south-west of Lot 102 commences a chain of meadows on Mackin Creek. They are owned by R. C. Cotton, the well-known Riske Creek rancher. A road from Riske Creek runs through these meadows to Lot 110, the most northerly of them, and a trail connects to Lot 102. Outside the meadows the ground is broken and stony.

TOWN OF SODA CREEK.

The surveys heretofore mentioned were all I made between Soda Creek and the 52nd parallel. The town of Soda Creek is one that must be visited to be appreciated. It consists of a few houses of comparatively ancient origin, telegraph-office, express-office, stopping-place, a small store, and a couple of Chinese shacks. The town, which formerly boasted two licensed hotels, is now dry. A ferry serves for crossing the Fraser at this point. The climate of Soda Creek is similar to that of the Dry Belt. Nowhere have I tasted better apples than are grown in the village. Irrigation is necessary for agriculture.

FOOT OF NAVIGATION.

Soda Creek, 167 miles from Ashcroft, is the point where the Cariboo Road first reaches the Fraser River. It is also the foot of navigation on the Upper Fraser, not for the reason that the river is unnavigable below, but because there is no business to warrant a steamboat service at the present time. About 2 miles below the town there is a canyon on the Fraser, but it is not as bad as other canyons through which steamers ply regularly. Below this, to Chimney Creek Canyon, the river is swift, having a current of about 8 miles an hour, but there do not appear to be any bad riffles. Not having had a clear view of Chimney Creek Canyon, I cannot say whether it appears an effectual obstruction to navigation, but I have heard that it is not impassable and could be improved; in this event the river would be navigable for at least some distance below the 52nd parallel. However, high clay banks, which are almost continuous on both side of the river from Soda Creek Canyon, render approach difficult.

WEST SIDE, ABOVE SODA CREEK.

My next work consisted of the survey of several pre-emptions and suitable pieces of land on the west side of the river above Soda Creek, this being a continuation of the work heretofore described. Seven pieces were covered by pre-emption record, but only three of these were occupied. Twelve of the parcels surveyed appear to me to be suitable for settlement. Some of the pre-emptions were apparently taken up purely for wood-cutting purposes. A cruise of the timber showed about 4,600 feet to the acre on two pieces and about 3,000 on the balance. There are some good poplar benches near Mackin Creek, which enters the Fraser about 6 miles above Soda Creek. While the arable land on these parcels is of no great extent, being only about 25 per cent. of the whole, the soil is good, a sandy loam, and should grow grain and vegetables without irrigation. One place, at 3-Mile Creek, is at present irrigated. Mackin Creek has a content of about 25 cubic feet per second in August, and, presumably, about 40 in the irrigating season. It has a rapid fall and could be used for irrigating these benches.

At Lot 6122, a high hillside, which follows the Fraser from Mackin Creek, recedes, and from this point for 20 miles north the land rises in benches from the Fraser. I surveyed lands for about 2 miles back from the river between this lot and Indian Reserve No. 3, forty-seven parcels in all. One of these is held as a purchase and three pre-emptions are occupied. Two other pre-emption records existed, but the holders were not in the district. Thirty-three of the other parcels appear to be suited for settlement. One man has pre-empted Lot 6115, a 40-acre sandy island in the Fraser.

Lots 6112, 6116, and 6117 are well watered, there being eight small creeks on the first named. The land rises from the river in grassy benches and is mostly covered with an open growth of poplar and fir. The soil is generally a clay loam, 6 to 12 inches deep, over hard clay. Without irrigation good crops of grain and vegetables are raised.

Five miles south-west of Lots 8000 and 8001 there are several meadows and a road to them has been built. I understand there are dozens of small wild-hay meadows on the plateau between here and Alexandria.

ROLLING LAND, SLOPING TO FRASER.

The land surveyed by me in this locality is mostly covered with a growth of poplar and some fir. The surface is rolling, with the slope towards the Fraser River. The soil is a clean clay loam, over clay. Potatoes and other vegetables, wheat and oats do well without irrigation, but water is necessary for raising good crops of hay and alfalfa. There are numerous alkaline spots. Several small springs of slightly alkaline water are found and one or two small creeks coming from the west. While water is not immediately available for the irrigation of this area, water for domestic purposes can be obtained from wells on all the parcels surveyed.

NARCOSLI CREEK.

Roads from Webster's and Middleton's lead to meadows on Narcosli Creek, about 6 miles westerly. I traversed these roads to tie in existent lots in that neighbourhood. Four pre-emptors have located places on the Narcosli, and I am informed that there is a strip of good land 9 miles in length along the valley. The elevation will be about 2,700 feet above sea-level. The soil is said to be good, a black loam, and summer frosts are reputed to do no damage.

EXTRACT FROM REPORT OF H. D. ALLAN.

DATED NOVEMBER 12TH, 1913.

[Mr. Allan was employed in 1913 by the British Columbia Government in making surveys in the Canoe River Valley.]

Surrounding the base of Canoe Mountain, which is at the northerly end of the mountain ranges separating the valleys of the Canoe and the Albreda, there is about 6,000 acres of jack-pine bench land. This bench, about 800 feet above the river, is very sandy and dry, and, although numerous streams are found around the foot of the main mountain-slopes, they disappear there and are not seen again until well down the slopes of the bench itself, the water seeping there through the sand and gravel which is so characteristic of this section of the country.

Along the river north of this bench there are some really good patches of poplar and willow bottom land, most of this having recently been staked by pre-emptors. So far, the only resident hereabouts is Mr. Maclosky, who has a strip of land under cultivation, including a small vegetable-garden, which in itself is ample proof of the richness and fertility of the soil.

From Packsaddle Creek as far as Hughallan River the valley averages about a mile in width. For the first few miles a great part of this is muskeg and swampy meadow land, especially on the west side of the river, where there is about 2,000 acres of muskeg in one piece. In my opinion, most of this, together with the other swamps throughout the valley, can be drained, and this would be no very difficult matter once the mountain streams were placed under control, for in most cases there is quite sufficient fall for the purpose. At present these streams are controlled by beavers, and wherever you go there is ample evidence of the work of these energetic creatures, the country in places being a mass of dams and lakes. As it is at present, it is useless for any one settler to attempt any kind of a reclamation scheme.

In a few instances fairly dry meadows are found. As nice a one as any is that of W. J. Essweins, a few miles below Ptarmigan Creek. He has a good dry meadow of about 70 acres. Below this one or two others are found, and around the edge of the largest one I was surprised to find wild red-top hay growing to a height of 5 or 6 feet. Immediately below Ptarmigan Creek there is a meadow of 120 acres, but this is generally a foot under water coming from one of the many branches of the creek. During the high-water period, from mid-June until the beginning of August, the river comes within a foot or so of the top of the bank; consequently there is not much chance of draining. However, when the water subsides there is a drop of

10 feet, and I think this land, without great expense, could be made dry enough to be of some use.

From Glacier Creek on the west side and Bulldog Creek on the east side, the country southwards assumes a heavily timbered aspect until Ptarmigan Creek is passed. Below the big log-jam, which is about 25 miles from Cranberry Lake—half-way between there and Hughallan River—excepting occasional patches, all the merchantable timber is on the west side of the river and extends far up the mountain-slopes. Excluding this heavily timbered part, the valley is covered generally with a fairly heavy growth of spruce, poplar, and birch, with dense willow-brush along the river-banks. A noticeable feature is that, while on the west side the growth is mostly spruce, on the east side it is mostly poplar, birch, etc. I should say that the bulk of the good land is on this side.

DRAINAGE.

The country is well watered, numerous streams affording all the water necessary for the irrigation of the available land. Cache Creek, the first stream of any size to be met with, is about 6 miles below Packsaddle Creek and flows generally in a south-westerly direction. During July it ran at the rate of 250 cubic feet per second, the normal flow being about 150 feet. This creek dashes through a picturesque canyon about a quarter of a mile above the trail to Golden crossing, and a head of from 60 to 80 feet is easily obtainable in a distance of less than 300 feet.

Yellowjacket and Bulldog Creeks are both of about the same volume as Cache Creek, but they do not fall so rapidly. There is a deep narrow valley where Yellowjacket Creek cuts through between snow-capped peaks. Bulldog Creek joins the main river about 4 miles above the log-jam, and from this point for 3 miles the Canoe River is very swift indeed.

The largest tributary of the Canoe between Camp Creek and Hughallan River is Ptarmigan Creek. Running in a south-westerly direction, it breaks up into numerous channels near the mouth. In the latter part of August the flow was about 350 cubic feet per second. As far as I explored, though the river is swift, I saw no direct falls.

The Canoe River runs from 2,000 cubic feet per second to 5,500 cubic feet per second.

HOT SPRINGS.

A quarter of a mile from the log-jam, about half-way between Cranberry Lake and Hughallan River, on the west side of the river are the Canoe River Hot Springs, situated at the end of a pretty lake of about 3 acres in extent lying at the foot of a rugged mountain-slope and surrounded by great cedars. There are two pools, one of them having a tent covering, and you can sit up to your neck in this very hot water. The other pool is unbearably hot. One can easily imagine a substantial hotel or stopping-place being built in such a place in the near future, and when accommodation is provided the hot springs will no doubt be visited by many.

SOIL.

Along the bottom land and on the low benches, as a rule, a good sandy loam and clay subsoil strata formation is found. Below the log-jam towards the base of Goat Mountain a heavy clay loam is to be found in many places. The side-hills and high benches are sandy and stony and are good only for pasturage, and that only to a limited extent. There is not an overabundance of feed in the whole valley. The bottom land is good and is not difficult to clear. The poplar or willow would cost about \$20 per acre to clear, but where spruce and pine is encountered the cost would run from \$30 to \$80.

SETTLEMENT.

A number of men have already gone into this district and taken up land, and when the valley is settled there will be no better general farming country in the same latitude. Some of these intending settlers have been discussing the possibility of fruit-raising, but I doubt if it could be done profitably. It has been tried around Cranberry Lake without success.

There is a growing tendency among a certain class, I find, to go out and stake land they have not the slightest intention of locating upon, or even recording. This sort of thing is detrimental to the quick opening-up of the country, and is rather aggravating to the *bona-fide* settler who comes along, probably with a pack on his back, and, owing to noting the stakes placed by these men, imagines a piece of land he favours is taken up and does not find out his mistake until out of the district.

ACCESSIBILITY.

Access to the valley is comparatively easy. From Mile 49 on the Grand Trunk Pacific Railway, which is 3 miles east of Tete Jaune Cache, travel by wagon is possible as far as the junction of Packsaddle Creek with the Canoe River, a distance of 25 miles. When the Canadian Northern Pacific Railway is in operation around Cranberry Lake, then railway communication will be within 5 miles of Packsaddle Creek. From there the traveller can go south through the valley by trail or canoe. The river, however, is navigable only for expert boatmen with any degree of safety, being a continuous stretch of swift water until the log-jam is passed. Below this, until Hughallan River is reached, the water is comparatively quiet. The distance from Cranberry Lake to the log-jam is 25 miles, and from there to Hughallan River another 25 miles. A new trail has been built as far as the log-jam.

SCENERY.

From a scenic point of view the country is unsurpassed. Taking a trip by canoe, provided the traveller knows the river or has expert boatmen to navigate the fragile craft around the tortuous twists, a magnificent view meets the gaze at every turn. At one time the voyager is rushing toward the base of some cathedral-like pinnacle, and the next minute sweeping onward in a different direction, with a vista of unparalleled scenery before him.

FISH AND GAME.

There is an abundance of big game, including grizzly and black bear, mountain-goat, caribou, and a few deer. The scarcity of deer is no doubt due to the great number of timber-wolves. Black bear are plentiful, being found all along the river-flats. There is very little fishing to be had in the main river. This is owing to the great quantity of floating mica, the river being white with it during high water. Good fishing can, however, be had by going a few miles up any one of the tributaries.

MINERALS.

So far there is no mining development, although the valley has been explored a great deal by prospectors. The nearest existing industry of this kind is the mica mine near Tete Jaune Cache.

EXTRACTS FROM REPORT OF C. W. MURRAY.

DATED NOVEMBER 25TH, 1913.

[Mr. Murray was employed in 1913 by the British Columbia Government in making surveys in the Beaver Creek Valley, about 30 miles south of Quesnel.]

Going north along the Cariboo Road, one travels over a more or less highly elevated, dry, and open country; but on leaving the road and going toward Beaver Valley, as the elevation gradually lessens an entirely different aspect confronts one; at every point the vast area, stretching to the distant snow-capped Rocky Mountains, seems to be timbered with black pine, fir, and spruce, down to poplar, cottonwood, and willow in the bottoms and basins, in most of which are lakes. This more particularly applies to Beaver Valley, which lies at an elevation of about 2,150 feet, 600 to 800 feet lower than the surrounding plateau.

This valley, which in all probability was an ancient river-bed, is very narrow, at no place being over a mile in width, a good deal of which is taken up by a string of lakes connected together by the Beaver River, which takes its origin in several large beaver-dams, with which the valley abounds, and after flowing a distance of about 50 miles empties into the Quesnel River about 35 miles from its junction with the Fraser River, where the town of Quesnel is situated.

The fertile benches, consisting for the most part of an underlying boulder-clay on either side of the valley, rise abruptly, to a height of about 200 feet, for nearly its whole length, gradually rising as you get farther to the east or west.

In this valley is one of the oldest and least generally known farms in the interior of British Columbia, it having been worked as such to provide food for man and beast at a stopping-house of note during the gold-rush to Cariboo in the early sixties, and is situated at the junction of roads leading from 150-Mile House, Alexandria, on the Fraser River, and Harpers Camp, on the Horsefly River, to Quesnel River and Lake; thence to Quesnel and Barkerville.

FERTILITY OF THE SOIL.

The soil, which would cost from \$5 to \$60 an acre to clear and put under cultivation, offers very good inducements for agriculture, as it mostly consists of a black loam with a gravelly subsoil, and in some places scattered boulders protrude. The great fertility of the soil is evidenced by the luxuriant growth of wild grasses, peavine, wild flowers, as well as strawberries, raspberries, red and black currants, bush and swamp cranberries. All of the hardier vegetables, such as turnips, carrots, mangels, cabbage, potatoes, etc., grow as luxuriantly, of as good quality, and as readily as on the Coast. Timothy and clover seem to grow wherever the seed is planted, often reaching the height of a wagon-box, and this even along the sparsely travelled roads and trails, with which the country abounds. A very faint attempt has been made to grow alfalfa, and present results would seem to imply successful crops if undertaken by experienced men. Oats and barley seem to be a sure crop both in the valley and on the benches, where no possible means of irrigation exist, although I understand during some years, not so wet as the past, irrigation, which a few have access to, is beneficial. Only one small field of wheat was noted, and from this our cook ground on a small hand-mill owned by a pre-emptor enough meal to make several pans of excellent biscuits.

During the survey I noted wild crab-apple and hawthorn trees in a couple of places, which fact would lead one to believe that the hardier varieties of apples and pears could be grown. No settler in the valley has tried growing fruit as yet. From what could be learned from the settlers the excessive rainfall during the past season was exceptional. During July and August thunder-storms were frequent, the temperature was not excessive, and with one exception during June there was no frost in the valley. This was so slight that it blackened merely the edges of a few of the young potato-vines.

Fall white frosts started during the first week in September, with occasional harder ones until the first week in November, when a thin coating of ice was formed on the shallower lakes. Squalls of snow started about the first of October, but, as the temperature was mild, soon disappeared, and when we left on November 4th there was practically no snow lying on the ground.

Settlers informed me that, although the thermometer drops to 45° below zero, this extreme is only for a few days, the average winter temperature not being much below —20°, and at any time a Chinook wind was liable to come up and melt off all the snow, which sometimes attains a depth of up to 3 feet. By the last of April the snow and ice are generally gone and ploughing can be carried on, the seed being sown during May and harvested in October.

MARKET FOR FARM PRODUCTS.

For the last two years, owing to the construction of the Grand Trunk Pacific and Canadian Northern Railways, the prices for hay and grain have been \$80 and \$100 a ton respectively at Quesnel, a two-day journey over a good road from Beaver Lake. As there will be considerable work on these railways as well as on the Pacific Great Eastern during the next five years, there will be a ready market for all local farm products. The country is also well adapted to raising cattle, sheep, and pigs, as there are large tracts of broken country on which abundant grass and peavine grow that is unsuitable for anything but grazing purposes, the valley and picked portions of the benches growing the winter's feed in the shape of hay and grain.

There are no timber lands, strictly speaking, although a few patches of large fir and spruce were seen; and over some of the side-hills there are a few scattered old fir, some up to 4 feet in diameter.

For the benefit of settlers finishing log cabins and outbuildings, Mr. Hamilton, during the past summer, has erected on his farm at Beaver Lake a small sawmill, which he runs by water-power.

Many patches on the side-hills and some of the plateaus have been fire-swept during the past decade, and over this area a thick growth of poplar, hazel, and fir have sprung up among the down timber.

As my work consisted of surveying ground suitable for agricultural purposes, I saw very little mineral, and that only a couple of protrusions of limestone overlying a fine iron-bound conglomerate. There has been some amateur prospecting on some petroleum-bearing shales in the upper part of the valley, while in most of the streams one can pan colours and in a few make small pay.

The many lakes and streams are all good water, with trout and other fish in goodly quantity in most of them, and where in the fall of the year may be seen flocks of ducks and geese; while in the surrounding willows and woods are rabbits, prairie-chicken, grouse, bear, and deer, the latter scarce but sufficient for hunting for food.

Taking it all through, one looking for land with an intention of settling down for a home could hardly find a better tract open for pre-emption in British Columbia and capable of accommodating numerous home-seekers.

EXTRACT FROM REPORT OF H. F. GARDEN.

DATED DECEMBER 8TH, 1913.

[Mr. Garden was employed in 1913 by the British Columbia Government in making surveys north of the 52nd parallel of latitude in the vicinity of the 150-Mile House on the Cariboo Road.]

KNIFE CREEK VALLEY.

Turning about due east from the Cariboo Road about an eighth of a mile below J. P. Murphy's 141-Mile House, where he has a fine ranch, and ascending the valley by a good wagon-road through a flat open range, with poplar and jack-pine and with ridges about half a mile distant on either side, grown with fairly good fir, this character of country extends for about $1\frac{1}{2}$ miles. Peavine and pine-grass afford good grazing. From here the valley narrows through a belt of good fir timber, with small fir and jack-pine. At about 5 miles the valley widens into a flat, and has a more gradual ascent. Here Mr. Murphy has a meadow of about 150 acres, off which he cuts about 200 tons of wild hay each year.

Messrs. Hill and Paul have an excellent ranch of 320 acres about a mile farther east, raising vegetables of the finest quality. They are also very successful in raising stock. The road continues north-easterly and joins the road running from the 108-Mile House to the Horsefly country.

Returning to the Cariboo Road and going northerly to the 144-Mile House, a fir ridge lies to the east, broken into by patches of open range country, while to the west the land is open and slopes towards the San Jose River, which is from half a mile to a mile distant. This land is chiefly hay meadow and pasture.

JONES CREEK VALLEY.

Leaving the Cariboo Road at Geo. E. Felker's place, the 144-Mile House, a good wagon-road runs in a north-easterly direction, passing for about $1\frac{1}{2}$ miles through rolling open range country, where it enters some good fir timber which, owing to open patches breaking into it, will only average about 3,000 feet per acre. The road here follows the top of a ridge, soon descending into the valley, crossing the creek about 4 miles from the 144-Mile House and half a mile above Jones Lake. Here north of the creek and extending west to the Cariboo Road, with a gentle slope to the south, is open bunch-grass country with hay meadows in the bottom. The greater part of this area has already been taken up and previously surveyed.

Continuing up the creek easterly, the road passes through good poplar and willow bottom land with small hay meadows, bounded on the south by a steep side-hill rising to extensive table-land, which affords good grazing, having a thick growth of peavine and pine-grass, also some jack-pine, fir, and some small poplar. It extends to Knife Creek Valley.

The northerly side of valley rises gradually, having varying growth of fir, jack-pine, and small poplar. At a distance of about 4 miles from the crossing the road enters Geo. E. Felker's pre-emption, Lot 88, and terminates.

The country to the east is practically flat and grown with jack-pine, poplar, numerous spruce-swamps, muskegs, and small meadows, and includes a lake of about 50 acres.

Returning along this road, on which many repairs were required to be made, as far as Jones Lake, a way was found through the open range of getting to the road running easterly from near the 150-Mile House without returning to the 144 and going by the Cariboo Road, thus saving a distance of about 12 miles.

150-MILE CREEK VALLEY.

Striking the road about a mile east of the 150-Mile House at John R. Hamilton's place, Lot 451, the road runs easterly and up the valley through a rolling timbered country, with

some poplar, good fir, and jack-pine, broken by several small meadows. At about 5 miles Thomas Hamilton has a meadow of about 120 acres of wild hay. From here the road continues easterly for about 3 miles through a flat, poplar, jack-pine, and spruce country, with several large meadows lying to the south.

Lying to the north of the last-described portion of country, about $1\frac{1}{2}$ miles distant from the road, is a rocky ridge having a width of $1\frac{1}{2}$ miles and extending about 5 miles east and west.

From the end of road previously mentioned, numerous meadows of from 10 to 100 acres in extent lie to the south and east, and to the north-east are several willow and spruce muskegs and beaver-swamps.

SOIL.

The soil, excepting the bottom lands, which is rich black loam, is generally a light sandy loam with gravel subsoil, and is grown with peavine and pine-grass, affording good grazing. The willow and poplar bottom lands, if cleared, I would consider to be of greater agricultural value than the natural meadows from which at present it is the custom to cut wild hay for winter feeding. This, I am informed, is necessary, as stock require to be fed from December 1st to the end of April.

TIMBER.

With the exception of the two places previously mentioned, in Knife Creek Valley and north-east of the 144-Mile House, the timber is not of much commercial value, although with a portable mill sufficient could be cut for building and other purposes. It is unnecessary to say that for all pioneering needs there is more than ample timber.

CLIMATE.

The annual rainfall for the past few years, according to local information available, has been from 10 to 15 inches. Local electrical storms of short duration are quite frequent during the months of July and August. During the survey wet days were experienced as follows: May, 1; June, 4; July, 4; August, 6; September, 2; October, 3 days' rain and 6 days' snow; November, no rain and 2 days' snow. On June 17th there was frost, but not sufficient to do any material damage. On October 3rd, at about 8 miles east of the 150-Mile House, there was a slight fall of snow, and on the 9th and 10th about 6 inches, although along the Cariboo Road the snow did not fall until November 6th, when there fell about 8 inches, which, however, soon disappeared. According to local reports, the snow in this vicinity does not usually stay until the middle of December. The average depth of snow is about 24 inches, lasting until about April 1st.

GAME.

Of birds, grouse, fool-hens, ducks, and geese are plentiful. Deer are scarce in the summer, but come down from the higher lands in considerable numbers during the fall. Of fur-bearing animals, beaver and muskrat are to be found in the swamps and muskegs. Rabbits are numerous and some marten and mink are to be found. Coyote are in evidence and an occasional bear may be seen. Rainbow trout ranging from 4 oz. to 2 lb. in weight are plentiful in the creeks.

EXTRACTS FROM REPORT OF T. A. McELHANNEY.

DATED DECEMBER 12TH, 1913.

[Mr. McElhanney was employed in 1913 by the British Columbia Government in making surveys in the vicinity of the Nazko River and in running the line of the 124th meridian of longitude from Mile 43 north of the 53rd parallel of latitude to the 55th parallel of latitude.]

The land surveyed lies about 2 miles west of Canyon Lake, which is on the wagon-road from Alexis Creek to the Nazko River. A new wagon-road from Quesnel to the Nazko River also gives access to it. The sections surveyed are drained by a small creek which flows into the Clisbako River, a short distance south of the confluence of the latter with the Nazko. They are in a large flat almost surrounded by low hills. The timber on them is, in general, jack-pine and poplar. It is interspersed with small meadows, muskegs, and lakes. The grass on the meadows is of excellent quality and generally red-top. Mr. McFarland, who has a pre-emption

there, and has lived there for three years, reports that a great deal of the land which is now muskeg may by draining and burning be made to produce good hay, and that there seems to be a tendency for these muskegs to get drier, as it is possible to cut hay in places which could not be cut three years ago.

The general altitude is about 3,500 feet above sea-level, and the frosts probably too severe for raising grain or vegetables. It is, however, admirably situated for raising stock.

The meadow land is limited and in small scattered patches. A fire has run over the country recently and cleaned up a great deal of the windfall. Over this burned area a heavy growth of fireweed is found. The soil appears to be rich, and it is probable that most of the land could be made to produce grass. The timber is of no value. Rainfall during the summer is very light.

COUNTRY SOUTH OF SINKUT LAKE SURVEY.

We started work from Mile-post 43 north of the 53rd parallel of latitude on June 17th. Five miles of line brought us to the summit of the range separating the Nechako and Chilako River drainages. Leading up to this divide is a gently undulating area, generally covered with jack-pine; scattered through it are small creeks, along which small meadows are found.

The summit of this ridge, which terminates in Sinkut Mountain at the north, is at the 124th meridian about 4,280 feet in elevation. The north side of the range is drained by Sinkut Creek. It is heavily timbered with spruce and balsam, reaching a diameter of as much as 30 inches. The soil is in general good, and there is evidence of considerable rainfall in the thick alder and red willow which is found on the northern exposure.

Two good waterfalls of about 40 and 50 feet were found in Sinkut Creek. An approximate determination of the delivery of the stream was made on July 7th. The results at this time would probably show a quantity in excess of the average delivery. The two falls are less than a quarter of a mile apart and could easily be used for small power purposes. Combined they are capable of delivering about 800 horse-power. They are in the west branch of the Sinkut Creek, about a quarter of a mile south of the confluence of the east and west branches, and about 8 miles south of Sinkut Lake.

SURVEYED LAND SOUTH OF SINKUT LAKE.

A fire has run over this land recently and destroyed a great deal of valuable spruce and balsam timber. In the vicinity of our line are large patches of good spruce killed by fire, but still standing and sound, and if worked soon would make good timber.

The greater portion of this land is still open for pre-emption. The land south-west of Sinkut Lake is being settled rapidly and the settlers are raising good crops of oats and barley. The natural meadow land is being sowed with timothy, which does well. Garden produce can be grown in most places, but in some places with uncertainty on account of summer frosts. Increased area of cultivation will in all probability tend to adjust this. The soil is generally of good quality and now produces a heavy growth of peavine and fireweed.

BETWEEN SINKUT LAKE AND NECHAKO RIVER.

The land crossed between Sinkut Lake and Nechako River was consistently good throughout. It is generally of low elevation, the highest point crossed being about 2,500 feet above sea-level, or approximately 400 feet above the Nechako River. There is very little land here open for pre-emption, as most of it has been already taken. In the vicinity of Stony Creek and Nulki Lake large fields of oats were seen, which were later reported to have produced as high as 75 bushels to the acre.

At the present time, when the Grand Trunk Pacific Railway is in course of construction, a ready market is found for all farm produce. The prices are very high, and though the cost of production is high on account of scarcity of labour and high freight rates on all farm implements brought in, yet the profits are good. Some grain-growers found it advisable to cut grain before it had fully ripened and market it as oat-hay instead of threshing it for the grain, as there was a great demand for hay there on railway-construction.

The completion of the Grand Trunk Pacific Railway will tend to adjust the prices received for farm produce, and also decrease the cost of the necessary equipment for starting to cultivate land, which will probably result in a larger number of settlers with limited means entering on the lands. Increased settlement will make the establishing of schools possible.

NECHAKO RIVER.

The land in the immediate vicinity of the Nechako River and for 3 or 4 miles north of the river is largely taken up and settled. Nearly all kinds of grain and farm produce are produced, and the whole country is rapidly assuming the appearance of a solid and prosperous agricultural community. Substantial buildings have been erected and in places whole farms cleared. The land is easily cleared. Not only land open for pre-emption, but also purchase land is being taken up, cleared, and worked profitably. Good roads have been built and more are under construction, following the section-lines and replacing the old irregular trails. A ferry crosses the Nechako River about a mile east of the crossing of the 124th meridian. This is locally known as Milne's Landing. Wagon-roads branch from here in all directions, to Fort George, to Stony Creek, to the Fort Fraser-Quesnel Road, to Fort St. James, and several new roads lead east and north to newly settled districts.

RIDGE BETWEEN NECHAKO AND STUART.

No new land suitable for general agricultural purposes was found in the Nechako basin north of the present surveyed land between the Nechako and Stuart Rivers. An undulating plateau of an average elevation of 2,900 feet separates the Stuart and Nechako drainages. Small creeks run irregularly through it and numerous small meadows are found up to 100 acres in extent. Summer frosts make general agriculture in there impossible, but the increasing demand for hay for winter-feeding of stock on settled land in the Nechako has led many settlers to visit these meadows recently, and in all probability the larger of these will be staked for pre-emption where wagon-roads are easily built.

An old trail leading off the present Fort St. James Wagon-road runs over this ridge to the Stuart River, crossing the river about 2 miles east of the 124th meridian. We used this trail for about 9 miles in moving camp. It apparently had been used very little for some time, and we found it necessary to do considerable work on it before using it.

TIMBER ON STUART RIVER.

Very little merchantable timber was found on the plateau. A fire had run through here recently and had burned a great deal of windfalls without doing much harm. The greater portion of the land is apparently unsuited for producing large timber, and a systematic burning of the windfalls would probably result in converting it into good range land, as fireweed and grass were found growing abundantly on the burned areas.

On the northern exposure of the Stuart drainage there is some splendid fir, spruce, and balsam timber. Some of this is held under timber licence. This is the best fir timber seen on the meridian, some of it running as high as 36 inches, and clean and sound.

AGRICULTURAL LAND ON STUART RIVER.

The bottom land on the south side of the Stuart River does not run far back from the river, and it is frequently broken by deep gulches and inlets from the river. The soil, however, is particularly rich and the undergrowth heavy.

LAND BETWEEN STUART AND NECOSLIE RIVERS.

The Necoslie River is a small, sluggish stream flowing in a north-westerly direction into the east end of the Stuart Lake, very close to the outlet from the same lake into the Stuart River. The land lying between these two rivers, running almost parallel, but in opposite directions and about 4 miles apart, is surveyed. The divide between the two drainages is very low and is covered by small spruce and jack-pine interspersed with small poplar. Close to both rivers poplar predominates. Trails following in a more or less general way the banks of the rivers give access to Fort St. James. There is a great deal of open land covered with thick grass and peavine. The soil is particularly rich and suited for agriculture. This is good stock country, and in this vicinity we found the best horse-feed of the season.

TEMPERATURES IN STUART BASIN.

By means of a maximum and minimum thermometer, temperatures were read. We were in this district in the early part of August and, camped in open land, we recorded some temperatures considerably below freezing-point. Later in the season an interesting comparison was

made with temperatures recorded by A. C. Murray, Hudson's Bay factor at Fort St. James, who keeps Government meteorological records. It was found on the same date at Fort St. James, which is only about 12 miles distant, that no low temperature was recorded; in fact, they had only one frost during the summer. It is difficult to account for these local variations, but the fact remains that they do exist independent of altitude and latitude and should be taken into account by the prospective settler.

BETWEEN NECOSLIE RIVER AND McLEOD TRAIL.

The land adjoining the Necoslie River to the north for about 5 miles is waste. It consists of broken rocky hills of limestone formation. No heavy timber has grown on these hills and in places they have been burned practically bare by recent fires.

At Mile 28 north of the 54th parallel of latitude and about 5 miles south of the trail running from Fort St. James to Fort McLeod, the line crosses the summit of a range 3,580 feet high, which rises to the east to a height of 4,200 feet. This proved a convenient observation-point in getting a general idea of the surrounding country and was of assistance in mapping small lakes some distance from our line. They could be mapped by depression angles much more quickly than by traverse, as the country in the vicinity of these lakes was almost impassable on account of windfalls.

The ridge is thickly timbered, though the timber is not heavy. Spruce, balsam, and jack-pine are found, the latter predominating. The trees rarely exceed 20 inches in diameter, but are tall and clean and well suited for poles or railway-ties. This ridge was at one time much more heavily timbered, evidence of which is found in the semi-decayed trees found. Very large fir has at one time grown on this ridge and a few scattered trees of fine quality are found. The green timber growing on the ridge is comparatively young. Forest-protection over this area is advisable, as it is bounded on both the north and south sides by windfalls. From the top of the hill the timbered area appeared to extend for a considerable distance east and south-east over an undulating country.

VICINITY OF FORT McLEOD TRAIL.

A flying camp was made east of Carrier Lake to explore the country in the vicinity of the Salmon River, Carrier Lake and Great Beaver Lake. The divide between the Salmon River and Carrier Lake is low, about 2,600 feet above sea-level. The land is rolling and covered with jack-pine and small poplar. In the vicinity of Great Beaver and Carrier Lakes there is a considerable extent of good land, unsurveyed, and also good spruce timber. The largest poplar and cottonwood of the season were found here.

NORTH OF FORT McLEOD TRAIL SURVEYS.

For 20 miles north of the surveys in the vicinity of the Fort McLeod and Manson Creek Trails the country is broken and irregular. It is made up of jack-pine ridges and valleys dotted with small lakes, spruce, muskegs, and meadows. Occasional small patches of good spruce are found. The soil in general seems to be very good, and on nearly all the jack-pine ridges a thick growth of alder and willow is found growing to the summit of the ridges. This is generally found among windfalls, which makes it very difficult country to travel through.

Access may be had to it by two trails running in a north-easterly direction from the Manson Creek Trail across the 124th meridian. Both these trails leave the Manson Creek Trail between its crossing of the Tsilcoh River and the crossing of Poison Creek. The most southerly bears generally east and keeps to the south of Lookout Mountain. It is an Indian pack-trail which is used a great deal as a hunting-trail, and was found in good condition as a foot-trail. I used it to bring in supplies for the work farther north, and also in coming out by Fort St. James at the end of the season. Very little work was necessary to make it a good horse-trail, as it runs generally through small poplar and jack-pine country, and is a hard, dry trail as far as we used it. It crosses our line about 47½ miles north of the 54th parallel of latitude.

The second trail crosses the southern shoulder of Lookout Mountain, shown on Mr. Swannell's topographic map, and intersects the 124th meridian about 7 chains north of Mile-post 56. This has been an old horse-trail to Robinson Creek, evidently built by white men for mining and prospecting purposes. It has been well cut out and good culverts built over the small creeks which it crosses. It is now in bad repair with windfalls, decayed timber in bridges, and second growth, and we did not find it advisable to use it, as it would necessitate a great amount of

work. It also is used as a hunting-trail by Indians, but horses cannot be taken over it now in its present state of repair.

NORTH OF LOOKOUT MOUNTAIN TRAIL.

From this trail to the end of our work at the 55th parallel of latitude the country is heavily timbered. Spruce and balsam predominate. These are large in diameter, up to 36 inches, and generally clean for a considerable distance from the ground. A large burn from the west crosses our line about Mile-posts 61 and 64, running about a mile east of the meridian and stopping in a well-defined line.

Observed from the top of a 4,600-foot hill, this timber seemed to cover the hills and valleys to the east as far as could be seen, though it is probable that in the lower altitudes, in the vicinity of the Salmon River, a larger percentage of the timber is jack-pine than is the case in the vicinity of the line.

A branch of the Salmon River runs close to our line, its feeders crossing in places. Where this runs through the burned area a thick growth of long, coarse grass was found. This was also found in patches high up on the hills, covered by the burn. While in this district snow covered the ground from October 3rd to 18th, and the horses had to live on the tops of this grass. We found that it must contain a large amount of nourishment, as the horses improved on it even under bad weather conditions.

Ripe raspberries were found in October. The season is evidently very late in the spring, and they do not ripen to maturity until very late in the summer. The flavour of these was found very much inferior to that of berries where the season is earlier and the sunshine more abundant.

From the dense growth of red willow and underbrush there is evidently a heavy precipitation of rain during the summer.

EXTRACTS FROM THE REPORT OF D. B. MORKILL.

DATED DECEMBER 15TH, 1913.

[Mr. Morkill was employed in 1913 by the British Columbia Government in making surveys on the South Fork of the Fraser River, between Goat River and Catfish Creek.]

The valley of the Fraser, in so far as flat land is concerned, commences about 10 miles above old Tete Jaune Cache (Mile 47), a point 30 miles from the source of the main fork of the river and at its junction with the Grand Fork, a stream fed by the glaciers of Mount Robson. This tributary, together with the McLennan River and Tete Creek, which enter 4 miles below the Cache, swell the Fraser rapidly, so that at no more than 50 miles from its source the main river has attained a width of from 150 to 300 feet, according to season.

At Tete Jaune (latitude 52° 50' N., longitude 119° 30' W.) the valley is 2 miles wide, and from this point strikes due north-west through bounding mountains rising from 6,000 to 9,000 feet above sea-level, and follows this direction without deviation for approximately 150 miles. The valley-floor is at a mean elevation of 2,250 feet above sea-level. At Goat River the valley is 4 miles wide, and from this point widens somewhat more rapidly, gaining to 8 miles in width at Catfish Creek (Mile 130).

The river follows a very winding course throughout its entire length, wandering from side to side of the valley—a general estimate gives its length as twice that of the valley itself. The rate of current varies from 2 to 7 miles per hour, but in general is about 3 miles, the fastest water being between Mile 100 and Mile 120, and including what are locally known as Goat River Rapids just above the latter point. These make a passage somewhat dangerous at low stages of water owing to the number of rocks in the channel. The stream has here widened to about 500 feet, though it is not deep.

From the head of the valley to Mile 53 the soil is sandy, with a little sandy loam in the bottom land, but improves from this point down. Progressing down-stream, the bench becomes well defined and generally level, with a sandy loam soil, gradually changing to a clay loam. The soil in the bottom land is a clay loam mixed with river-silt. The subsoil is generally clay, both on bench and bottom land, and these conditions continue to a point a few miles below McBride (Mile 90).

TIMBER.

The whole of this area has at one time been covered with a growth of spruce, fir, and cedar timber, which has largely been destroyed by ancient fires; but that the original stand has been a heavy one is evidenced by patches remaining here and there which contain large trees, the cedar and fir reaching to 4 and 5 feet in diameter, and reminding one in their size and accompanying undergrowth of the Pacific Coast forest. These isolated remains of the original growth are not extensive and occur generally near the base of the mountains, but cover occasionally an area of 50 to 100 acres. A second growth of spruce, fir, and cedar (up to 30 inches) is standing in parts of this section, notably between Miles 62 and 66 and Miles 80 and 85 on the south side of the river, and between Miles 79 and 83 on the north side. A large proportion of the latter is the jack-pine (or lodgepole pine), averaging 18 inches, a fine clear tree and much in demand for railway-ties. The banks of the river are generally lined with cottonwood, alder, and willow.

The main part of this section, however, is not timbered, but has a light growth of poplar, alder, and brush, easily cleared, and is excellent agricultural land. The cost of clearing should not exceed \$25 per acre over the lighter growth, and will probably be \$75 to \$100 per acre on the timbered portion.

BENCH ON EITHER SIDE.

The bench on either side of the river increases in height from 40 or 50 feet above the bottom land at Tete Jaune to about 200 feet at McBride (Mile 90), at which point the valley is 4 miles wide. This stretch of valley contains the best agricultural land of any of the upper river, and its suitability to mixed farming is well demonstrated by the growth of vegetables obtained by numerous squatters—the valley being under reserve from settlement since 1907, there are no regular settlers. Gardening has, as usual with squatters, been carried on in a more or less haphazard way, but results, even with this minimum of attention, with such garden-truck as potatoes, parsnips, beets, lettuce, radishes, onions, peas, cabbage, and rhubarb, have been very satisfactory and timothy and oats have done well where they have been tried. Systematic experiment is lacking. Throughout this section peavine and vetches are found in the open patches, and berries are fairly plentiful, notably strawberries, raspberries, and huckleberries.

WESTWARD FROM McBRIDE.

Westward from McBride (Mile 90) the contour of the valley, the soil, and growth undergo a change. The benches become higher and more broken and the soil contains more clay and less loam, while the river banks and bars become gravelly in place of the sand and silt seen in the upper portion of the valley. The growth of timber is heavier and the trees of larger size—though for a few miles in the neighbourhood of Goat River they are not all sound—and the rain and snowfall appreciably greater.

The soil on the bottom land continues throughout to be clay loam mixed with silt, but that on the benches is a lighter clay loam, losing most of the loam and becoming almost wholly clay as the Goat River is passed (Mile 114). From the neighbourhood of Mile 110 to the end of our work (Mile 130) the country is practically all timbered with balsam, fir, spruce, and cedar, and occasional large firs, with birch scattered throughout. The exceptions are the scenes of recent fires and a chain of permanent swamps on the benches on either side of the valley. These swamps are in reality shallow muskegs on clay (gumbo), and carry an irregular growth of small and stunted jack-pine and scrub spruce. It is possible that with the removal of the surrounding timber these muskegs will dry out and form agricultural land, but drainage and burning, the usual method of treatment, do not appear practicable at present.

I should judge about half of this section of the valley to be covered with merchantable timber, and the river-flat where burnt over or when logged off, and portions of the bench on the north side of the river, to be well suited to agriculture. The bench land on the south side is generally too broken for agricultural purposes, and the stiff clay thereon unsuitable, though supporting a good timber-growth. The cost of clearing will range from \$100 to \$150 per acre, though a much smaller figure would apply to selected parcels.

CLIMATE.

Climatic conditions throughout the valley are similar as regards the seasons, period of growth, and temperature, but vary locally in regard to rainfall and snowfall. As a general rule, the first week in May sees the trees and shrubs budding and small plant-life well on. This year

the cottonwoods and willows were noted to be breaking bud on May 10th, and all trees were well in leaf shortly after the middle of the month, and wild flowers appearing. I learn from residents that it has been the practice of those who have worked the soil to plant garden-truck on May 15th, and that they have not found this date to be too early.

The river commenced to feel the effect of warm weather on May 8th and rose steadily from that date. The rise from low to high water is in general 2 feet.

There is not much wind in the valley during the summer months, but a feature of the October and November weather is the high wind which blows down the valley from the south-east, probably drawn through the mountain pass by the relatively high temperatures on the western side of the Rockies.

For convenience, the records of maximum and minimum thermometer, rain-gauge readings, and other observations are shown in tabulated form, and the tables of 1912 records are appended for comparison. It should be noted that the records for 1912 were made in the comparatively open country of the upper portion of the valley, while those for 1913 apply to the lower and heavily timbered section, where rainfall is greater.

Records were taken this year commencing May 19th, and from that date no frost was recorded until September 24th (32°), though reports from points farther up the river state that several frosts were experienced during the late summer. Our records, however, for the previous year showed no frost between June 6th and September 4th in the upper valley.

The following data as to winter conditions are gathered from those who have spent several winters in the district:—

- Average snow in upper valley, 18 to 24 inches.
- Average snow in timbered valley, 24 to 36 inches.
- General range of temperature, 20° above to zero.
- Extreme winter temperature, occuring in late January and early February, 30° to 40° below zero.

River opens March 15th.

The following tables for 1912 and 1913 deal with climatic observations:—

	Hours of Sunlight.	No. days on which Rain fell.	Rainfall.	Max. Temp.	Min. Temp.	Mean High Temp.	Mean Low Temp.
1912.							
June.....	224	7	Inches.	86	20	69	38
July.....	164	14	.....	85	36	70	45
August.....	175	15	.....	80	36	65	44
September.....	183	5	.....	.....	.....	.....	.....
October.....	98	13	.....	.....	.....	.....	.....
November.....	55	5	.....	.....	.....	.....	.....
1913.							
May (12 days).....	74	4	2.00	76	33	62	41
June.....	253	9	2.16	82	33	72	44
July.....	204	15	3.07	88	38	73	47
August.....	192	14	6.50	83	38	70 *	47
September.....	159	13	4.50	67	31	57	41
October.....	116	13	3.05	52	21	44	33
November.....	80	10*	.....	52	14	38	29

* Rain and snow.

	1912.	1913.
High water.....	End June.	End June.
Low water.....	Dec. 1st.	Dec. 1st.
First snow.....	Oct. 16th.	Oct. 8th.
Snow remains.....	Nov. 29th.	Nov. 20th.
River freezes.....	Dec. 5th.	Not closed on Dec. 1st.

LUMBERING.

The main industry of this part of the valley, other than farming, will be lumbering, and this should reach considerable proportions. An idea of what it will amount to may be drawn

from the fact that on the Fraser River, and tributaries entering it, between Mile 80 and Mile 130, there are 192,000 acres held under timber-cutting licence, none of which has yet been cut, and of which the logical milling-points are in this locality; while farther down river the holdings are much more extensive, the next 50 miles containing about 300,000 acres under licence, with a great deal of timber yet remaining to be disposed of by the Province.

The lumber-mills which will be built to handle this timber, together with the towns along the railway and the City of Fort George, should prove a ready market for farm produce from this district. One large mill is now constructed at Mile 142, another projected at Mile 128, and several more sites applied for.

FOREST FIRES.

During 1911 and 1912 a number of forest fires followed railway-construction and destroyed a large part of the standing timber—in the area surveyed this season about 4,000 acres—though their effect over the poplar-flats has not been very injurious, and, if anything, has only made land-clearing easier, and with the exception of very hot fires the soil has not been damaged. Several times during the 1912 season the fires assumed ominous proportions and necessitated the survey parties and others moving camp in a hurry. Owing to the efficient control of the Forest Branch of the Lands Department this season, however, there have been no fires worth mentioning, and in the course of survey-work there were none encountered or seen.

GOAT AND MORKILL RIVERS.

The two main tributaries of the Fraser passed in this season's survey are the Goat River (Mile 114) and Morkill River (Mile 126). The former is about 125 feet wide where it enters the Fraser Valley, above which point it is a rapid stream in rocky and gravelly bed between steep slopes, with no valley lands and unnavigable by boat or canoe.

The Little Smoky is a wider and more sluggish stream, though not carrying the same volume of water, and may be ascended by poling boat or canoe for a distance of 30 miles. It has a more open valley than the Goat, with a flat of from half a mile to a mile in width extending for 15 miles up-stream and about 2 miles wide where it joins the Fraser Valley. Both streams carry timber, which is held under licence, for a distance of 10 miles on the Goat and 20 miles on the Little Smoky.

GAME.

Game is plentiful, especially in the portion of the valley surveyed this season, where moose and caribou find their natural range, and a large number of the former have been encountered from time to time in the course of work. Goat are found in the hills and black bear generally throughout the valley. Grizzly bear are to be had on the tributary streams, but do not appear much on the Fraser. Of the fur-bearing animals, the marten, mink, and lynx are found, and, though not particularly plentiful, the fur is of a good grade. Beavers are found everywhere in large numbers and their houses and dams are seen on all streams and wet flats. Willow-grouse are in the valley and ptarmigan on the hills. Rabbits are numerous. The small streams contain mountain trout, and the river large trout and char.

The sportsman could not wish a more inviting country, nor the mountaineer. The latter will find within easy reach of the railway numerous peaks of an altitude of 10,000 feet, and, of course, the famous Mount Robson, with its height of nearly 14,000 feet above sea-level, closely skirted by the Grand Trunk Pacific and Canadian Northern Pacific Railways.

EXTRACT FROM THE REPORT OF J. A. WALKER.

DATED DECEMBER 15TH, 1913.

[Mr. Walker was employed in 1913 by the British Columbia Government in making surveys on the South Fork of the Fraser River from the Dore River to Torpy Creek (formerly known as the Clearwater River).]

TIMBER.

A noticeable change of timber takes place from the upper to the lower portion of the South Fork. In the vicinity of the McLennan River, where the soil is light and gravelly, small jack-pine and poplar predominate, while farther down the river, especially from McKale River to

the canyon, in the heavy clay and loam, a good stand of cedar, spruce, balsam, and cottonwood is noted. The country above the McKale however, gives indications of at one time having a considerable stand of cedar and spruce, but most of it has been burned many years ago. The timber-line is about 3,000 feet above the river.

In the spring of 1912 some bad fires raged from Dome Creek to Dore River, and in places destroyed a great quantity of timber as well as railway-construction equipment and camps. The efficiency of the Forest Branch of the Department of Lands this year has been amply demonstrated in the fact that there have been but very few fires, and these were of a very small compass.

CLIMATE.

The summers are, as a rule, rather wet. The precipitation would appear to be greater in the vicinity of the Grand Canyon than up-river. No doubt the great timbered area here and the disappearance of the mountains influence the climate to such a degree. In the late autumn this region is somewhat warmer.

Thunder-storms occur throughout the valley, but are not very severe or frequent. The summer evenings are usually cool. Light frosts were noted a couple of times, once in June and again in September. The most characteristic feature of the autumn months is the high wind which blows up and down the valley. It sometimes resembles the "Chinook" wind of the country on the eastern slope of the Rockies.

The break-up in the river usually occurs about the middle of March. After the first flood the river goes down again, but in the first half of May it becomes high enough for the small flotilla, such as scows, etc., to navigate. This year, on May 25th, all three of the large boats arrived at Tete Jaune from down-river points. From the middle to the end of June sees the high-water mark, and with the end of August comes the last of the steamboat traffic. About the end of October, when "frazzle-ice" begins to run in the river, the smaller boats are usually taken off, and by the first of December the lowest stage of water is reached. About this time the river generally freezes over, and about the middle of January it is safe enough for heavy freighting.

The snowfall does not amount to much until nearly Christmas. The average depth at the river seldom exceeds 2 feet, and it is all gone by the middle of April. The usual winter temperature ranges from 20° above to 10° below zero, and, as a rule, fine bright weather prevails throughout. The minimum temperature, from 30° to 45° below, does not come until January or February, and lasts only about a week or ten days.

DORE RIVER DISTRICT.

This portion of the valley lying between the Castle (or Cottonwood) and McKale Rivers (from Mile 84 to Mile 100) is between 3 and 4 miles in width. The mountains are from 6,000 to 8,000 feet above sea-level. It is a very attractive country, and from an agricultural view-point it is the most desirable of any in the valley. With the exception of small areas on Castle River, at the mouth of Dore River, and on the north side of the Fraser towards McKale River, the timber has been burnt off many years ago.

East of Dore River the land lies mostly on the south side of the Fraser and is on a bench from 50 to 100 feet above, with a gradual slope towards the river. The subsoil is clay, with a top soil varying through rich peaty soil, sandy loam, and clay loam to clay. It is covered with a small growth of red willow, alder, poplar, cottonwood, and birch. It is also thickly covered to a large extent with windfall. On the mountains to the south the timber consists chiefly of large cedar, considerable of which is hollow, spruce, balsam, hemlock, and scattered fir. In the vicinity of Castle River jack-pine is growing in considerable quantities. The Grand Trunk Pacific follows a course about half-way between the river and the foot of the mountains. There are a few beaver-swamps and sloughs, but these could easily be drained. Apparently no irrigation is necessary, and there are plenty of small creeks running the year round to furnish water to settlers.

To the west of the Dore it is more broken up and higher in regard to the bench land. The land is more equally divided on both side of the Fraser. The soil is more varied than that on the east. Near Dore River there are large gravel-beds. As these run out, sandy clay and "gumbo" are found. The latter soils are the more prevalent. It is good land and covered with a small stand of poplar, spruce, and balsam. The bottom land for the greater part is of sandy loam on gravel subsoil.

Throughout the district small fruits grow very luxuriantly. In July wild raspberries, strawberries, and gooseberries grow in abundance and ripen well. Blueberries, huckleberries, and, in the higher ground, cranberries are also found. Near the deserted railway camps grains were noted—oats, rye, etc. It is not known with what success they could be harvested if allowed to ripen, as they were cut green, but they "headed" exceptionally well. Peavine and various grasses grow in the open places.

The district seems to be well adapted to truck-gardening. The success of a couple of squatters for the past three or four years in this branch was phenomenal. Better potatoes I have never seen nor tasted anywhere. Turnips, radishes, beets, carrots, onions, and lettuce grow remarkably well. In the early summer the valley is a bower of bloom of all colours. During the season specimens of flower and plant life were collected and prepared for the Provincial Botanist.

EXCELLENT COUNTRY FOR MIXED FARMING.

The country should be an excellent one for mixed farming. The great drawback at present is the limited area for pasturage owing to the obstructing windfall. Most of this land can be cleared for \$20 to \$40 per acre, according to an experience of a squatter. In fact, it should be cleared for less with the proper equipment.

The insect-life is very plentiful. All kinds of beetles, bugs, caterpillars, and butterflies, beneficial, obnoxious, and indifferent, were seen. Mosquitoes are very plentiful and very troublesome during the hot weather.

The district is very warm in summer, though the heat is tempered by cool breezes. Only once this summer was frost noted. On June 6th we had a thin coating of ice in our water-bucket. No flowers nor plants, however, were seen to have been damaged by it. In the winter it is somewhat colder than farther down the river owing to the openness of the country.

Situated as it is, so near the Prairie markets, the land will well repay the *bona-fide* settler for his efforts. From what I have seen of the country I am convinced that cultivated fruits, as apples, pears, and plums, would thrive very well. When the land begins to be settled up, a small experimental farm run under the auspices of the Government would be of very great service to the settlers in demonstrating what could be done by correct methods of farming. In this way, also, a Government Inspector would always be on the ground to watch for diseased shrubs and trees and live stock, which, for a few years at least, will find their way here from points outside the Province.

TORPY CREEK DISTRICT.

The Fraser Valley immediately above Torpy Creek, from Mile 130 to Mile 136, is from 8 to 10 miles in width. The elevation of the valley here is about 2,100 feet and the mountains on either side rise to a height of 6,000 to 7,000 feet above sea-level.

The bottom land has generally a subsoil of clay and, in a few instances, gravel, with a top soil varying from black muck or peat in old beaver-sloughs to clay loam. When cleared it will make good agricultural land.

The bench on the north side of the Fraser is from 50 to 200 feet above high water rising from the river in steep clay cut-banks. In several large areas the land is of a swampy nature, though fairly well timbered. This land could be easily drained and would then be fair agricultural land. Near the river it is cut up by ravines. The soil is of a peaty nature on a subsoil of clay.

On the south side it is a rolling country, excepting opposite Torpy Creek. Here it is very much broken up and badly distorted, due to the influence of Ptarmigan Creek and to its geological structure. Near the river the hills rise to a height of 400 to 600 feet above the river. Beyond that the country slopes to the Ptarmigan and its tributaries. On the east side of the Ptarmigan the outcroppings of limestone rock are such that one cannot trace a regular formation. It has apparently been of the same formation on the west side, but quartz has been thrust up from underneath, metamorphosing the adjoining rock, which originally appears to have been limestone but is now a schistose rock. These quartz outcroppings are very frequent. This portion of the country is quite unfit for agricultural purposes.

Part of the timber in the surveyed area is held under licence. In the bottom land it runs heavily to a very good quality of spruce up to 24 inches, balsam 12 to 20 inches, birch 8 to 12 inches, scattered cedar up to 30 inches, and cottonwood up to 40 and 50 inches. There are also small poplar, alder, and willow. The timber will run about 7,000 to 8,000 feet to the acre. On

the north side of the Fraser in the swampy areas it is mostly spruce and balsam averaging 12 inches. In the drier sections there is a heavy stand of cedar up to 36 inches. Spruce, balsam, and hemlock and scattered fir and pine were noted. The south side, east of Ptarmigan Creek, is heavily timbered. Here are found large cedar, usually sound. Spruce, balsam, hemlock, and scattered fir were found. The timber will here run as high as 8,000 or 9,000 feet to the acre. In the Ptarmigan watershed there is also a heavy growth of timber, but of a poorer quality. The cedar is usually hollow. In the basin spruce and balsam are found. The high rocky ridges grow poor hemlock. There is no burnt area on our work of this year. The cost of clearing would run from \$75 to \$100 per acre. The country is practically uninhabited. Daily trains run through this section from McBride as far as the second crossing.

Along the Grand Trunk Pacific right-of-way beyond Mile 136 the subsoil is blue clay or gumbo with quicksand pockets throughout it. This, with the wet weather prevailing, has produced many bad slides. In this vicinity several acres have sloughed off and are gradually oozing into the river. The mosquitoes are very numerous and were particularly vicious during a period of hot weather in July. The black-flies, however, did not bother us. One summer frost on September 2nd was noted.

WATER-POWER.

Throughout the length of the South Fork of the Fraser River there are numerous large streams that will in time, no doubt, be utilized to generate power. In the Fraser itself, especially in the upper stretches near Mile 37, there are many narrow canyons that lend themselves quite readily to sites for dams, etc. On the Grand Fork River are Emperor Falls, with a drop of 200 feet.

Dore River (sometimes called 50-Mile River) has a current of about 2 or 3 miles per hour and a flow of about 500 cubic feet per second in an average stage of water. This river would apparently be more adapted for a town water-supply than for a source of cheap power. Across from Dore River and about a mile up the Fraser are Sunbeam Falls. These, however, are of a very small flow—though they have a head of a couple of hundred feet—and are liable to freeze up in the winter. They are more of a scenic than a commercial value.

Goat River has a current of $2\frac{1}{2}$ to 3 miles an hour. Morkill, Ptarmigan, Torpy, Dome, Bowron, McGregor, Willow, and Salmon Rivers are the chief tributaries until the Nechako River at Prince George is reached. They all have more or less power possibilities, but, with the exception of Ptarmigan Creek, will have to be passed over.

Ptarmigan Creek Falls are about $2\frac{1}{2}$ miles up from the Fraser. They have a total head of over 250 feet and would develop approximately 8,000 horse-power. There is an excellent site for a power plant at the foot of the falls. The Grand Trunk Pacific has located a line for a spur to the foot of the falls for the purpose of getting rock for riprapping.

MINERALS.

In regard to minerals, the country has so far been a disappointment. Though it has been and is being well prospected, no mineral-deposits of note have been discovered. In the Yellowhead some showings are reported to have been found, but are of no great value. Within a few miles of Tete Jaune, on Sand Creek, a whole mountain of mica is reported to have been staked. This mica is noticed in the river-silt all through the valley. In high water the fine particles in the river make it unfit for drinking purposes.

Recently several claims have been staked on Ptarmigan Creek near the falls and are being prospected. I have been unable to ascertain the assay values, but no great strikes are reported. At the Grand Canyon several claims, I understand, have been staked, the showings being copper, silver, and gold. On the Bowron River large coal areas have been staked.

Above Ptarmigan Falls there is an immense amount of limestone, an inferior quality of marble, and schistose rock adjoining quartz outcrops.

GAME.

Following the completion of the grade and the abandoning of the railway-construction camps, the game seem to have come to their own again. Game of all kinds are seen at the river in greater numbers than last year. The passing trains do not appear to hold any terror for them.

Moose and bear of the larger game were seen quite frequently, the former being encountered occasionally while we were at work. In September one of my party shot a grizzly bear from 5

to 6 cwt. on the river-bank less than a mile from camp. Caribou, goat, and black bear abound. Beaver are very plentiful and are becoming a nuisance in several localities. Numerous dams, lodges, and flooded areas were run across in our work. Marten and mink were noted. Ermine or weasel and rabbits are quite plentiful this year. Coyotes, lynx, skunks, and otter were occasionally noted. Wolf-tracks were seen on the hills up Ptarmigan Creek. Ducks, ptarmigan, and other varieties of grouse are plentiful. Geese are scarce.

Several varieties of trout are found in the streams, though there seems to be a scarcity of fish in the Fraser. As far as 20 miles up Torpy Creek salmon were caught this year. A game reserve is placed on the Torpy and Morkill watersheds.

The country is verily a sportsman's paradise, but it must be borne in mind that, though the game is present in sufficiently large numbers, it takes skill and patience to land the quarry.

INDUSTRIAL POSSIBILITIES.

The heretofore chief industry of the valley, that of railway-building, is now a thing of the past; all that remains in connection with the railway is the maintenance and operating of it.

The lumbering industry will be the chief and the most staple for some time at least. There are in the valley between 700 and 800 sections held under licence by different interests, to say nothing of the greater part held by the Crown.

At present there is a small mill near Mile 64. The output is nearly all used by the railway in construction. Near Castle River an enormous number of railway-ties have been got out during the past year. At Mile 142, near Dome Creek, the Upper Fraser River Lumber Company is just completing a large mill which will have a maximum daily capacity of 100,000 feet. A few other companies are also preparing to erect mills along the river.

When the reserve is taken off, mixed farming and fruit-growing will likely become a general industry. While the fur-bearing animals are plentiful, trapping will always be carried on by those so inclined.

The heavy clay which exists in such large quantities throughout the length of the valley might be turned to a commercial use in the manufacture of brick and tile not only for domestic use, but also for export. In several instances I have noticed that where bonfires have been this clay has been baked to an almost unbelievable hardness.

Quarrying for limestone and marble may turn out profitable if some exploratory and experimental work were done.

EXTRACT FROM THE REPORT OF D. McDOUGALL.

DATED DECEMBER 31ST, 1913.

[Mr. McDougall was employed in 1913 by the British Columbia Government in making surveys in the vicinity of Eaglet Lake (formerly Eagle Lake).]

Work was commenced on the narrow strip of unsurveyed land lying north of the Willow River just below its junction with Hay Creek (formerly known as Eagle Creek) and along the latter creek. For the first 2 miles the country is very hilly and is timbered mostly with spruce and poplar, fairly open in places towards the south, but becoming thicker towards the north. There is a scattering of large fir and some white birch and jack-pine, but only a small percentage of the spruce and the fir is of merchantable size. The soil here is for the most part a rich brown loam, with clay or gravel subsoil, but there is a lighter soil in places on the ridges and a covering of thick black muck in the bottoms.

The land to the south of Hay Creek is very flat and is subject to flood in the spring. The soil for the most part, however, is firm, and is composed of fine clay loam, with a covering of black muck averaging 2 inches in depth, and with a clay or gravel subsoil. The timber consists of scrub spruce, poplar, and birch, and there is a thick undergrowth of willow and alder. The flat to the north of the creek is not very wide, and to the west the land rises gradually into a hilly country, with several open poplar side-hills. On the east the ascent is more abrupt, and rocky bluffs rise to a height of 200 feet. These rocky ridges continue to run in a north-easterly direction for about a mile from the west end of Eaglet Lake, along the north shore of the lake. From this point easterly to the end of the lake there is a flat averaging 20 chains in width and broken only by slight rises. The soil on this flat is a very fine chocolate loam, with a clay or

gravel subsoil, and has 2 or 3 inches of black muck on top. Back from the lake there is a scattered growth of large spruce, which becomes thinner nearer the lake, and finally gives place to a thick growth of willow and alder. The land covered by these latter is subject to flood.

To the north of the flat along the lake the land rises to about 200 feet above the level of the lake—that is, to about a level of about 2,150 above sea-level—and is very rough and heavily timbered for about a mile back, when the country becomes more level and the timber smaller and thicker. There appears to be an abundance of pulp-wood, in the shape of spruce and poplar, growing very close together in the country to the north of the timber limits on Eaglet Lake. The soil is a chocolate loam and the surface fairly level.

SOUTH OF HAY CREEK.

The flat to the south of Hay Creek extends easterly a little beyond Harvey Creek, where the ground commences to rise and forms a large rocky ridge running a very little south of east. Where our lines cross it near the south-east corner of Timber Limit 31490, it attains an elevation of 2,550 feet above sea-level—approximately the height of land—and is timbered with spruce and fir. The latter grows in scattered bunches running from 24 to as high as 70 inches on the stump and standing very tall and clear. There appears to be considerable unalienated timber on the land to the south of the timber limits now surveyed, and possibly there might be good farming land to the south of the rocky ridge mentioned above, for, though we were not far enough south to ascertain this fact, the country seems to drop off. There are outcroppings of solid rock on the ridges and the soil on the valleys is a rich brown loam.

There is comparatively little level land along the south shore of the lake, as the rock bluffs extend in several places right out into the water on the west end, and the country south of the east end is very hilly. In the valley of Hay Creek, the inlet at the east end of Eaglet Lake, there is a strip of level land about 40 chains wide and extending up as far as our surveys went. Towards the foot of the hill on either side of this flat there is a fair growth of large spruce, balsam, poplar, and birch, but this thins out towards the creek and finally gives place to a thick growth of willow and alder. Owing, presumably, to the abundance of rain this season and to the amount of surplus water emptied into it from the drainage-ditches on the Grand Trunk Pacific right-of-way, Eaglet Lake has been abnormally high.

NORTH OF HAY CREEK.

The country to the north of the flat along Hay Creek for over a mile is broken by ridges running east and west, and is fairly heavily timbered with spruce, balsam, poplar, birch, and fir. The soil is a heavy brown loam. Farther north the surface seems more level and there are several beaver meadows, but otherwise the characteristics are the same. To the south of the creek-valley the surface is also broken and the timber is smaller and thicker in growth. Spruce again predominates, while poplar, birch, fir, and balsam are found here and there throughout.

The settlers in this vicinity have been very industrious in the face of many hardships, but their industry and perseverance have not been without reward, as they are now raising excellent crops, and this year at least the prices have been very high on account of the railway-construction. Potatoes and vegetables sold from 7 to 10 cents per pound, and in one case \$240 was paid for a ton of potatoes. The crops of hay and oats were very good, but owing to the heavy rains the latter did not ripen and were cut green for feed. The garden-truck, including potatoes, were splendid, even tomatoes, cucumbers, sunflowers, and corn being grown with a degree of success.

On Mr. Lee's place several of the pre-emptors clubbed together and cleared about 15 acres of land on an open poplar side-hill with a southern exposure. The soil was the usual brown loam found in the district, with several inches of black mould on top. They broke about 4 acres by hand, as it was impossible to procure a team or a plough in the spring. Their best crop was potatoes, of which they received twenty-three sacks for each sack planted, and besides being large they were of very good quality. The other vegetables were not far behind.

There was only one garden amongst all that I saw where the summer frost had left any traces, but even here there was no great damage done. The land in question was close to the water, but perfectly dry, and had a southern exposure. The first frost of any consequence was near the end of September.

There is no water-power in the district of any importance, as the larger creeks have but very little fall. The rainfall this summer was exceptionally heavy, but even under normal conditions

it is heavier than in the country to the west of Prince George. The snowfall last winter was also much in excess of the usual; according to the measurement of several it was about 8 feet. This is, of course, considerably above the average. There is an abundance of game in the country, consisting of moose, black bear, deer, and rabbits. A great number of ducks and geese nest and rear their young on the shore of the lake and streams. The fur-bearing animals are also numerous, including beaver and muskrat.

EXTRACTS FROM THE REPORT OF R. W. HAGGEN.

DATED OCTOBER 21ST, 1914.

[Mr. Haggen was employed in 1914 by the British Columbia Government in making surveys in the vicinity of Quesnel.]

CLIMATE.

The climate of the district is good. There is not excessive rain, though the summers are showery, enabling crops to be grown without irrigation. During the hottest summer weather the temperature rarely exceeds 85° in the shade. The nights are cool. At elevations in excess of 2,000 feet frosty nights sometimes follow wet weather in the summer. About July 10th, when camped at Laronde's, 10 miles from Quesnel on the Barkerville Road, at an elevation of 2,400 feet, there was a frost, the temperature being 27° F. Expecting to see a good deal of damage done, I visited the fields of two pre-emptors in the locality, but was agreeably surprised to find that no damage had resulted. There was only an occasional blackened potato-leaf to indicate that there had been any frost. It is claimed by some farmers, and apparently with justification, that the unirrigated crops in the district will stand as much as 8° of frost without being damaged. This would not, I think, hold good if the crops were to be struck by the rays of the early morning sun; the great safeguard against damage from this source is to see that they are protected from the early sun by either bush or the slope of ground.

As a rule, the first severe frost comes about the end of September; snow at any time after November 1st; snow disappears about April 1st. Good sleighing generally lasts from December 15th to March 1st. The extreme winter temperature is about -50°. As a general rule, the winters are clear and frosty, temperatures on average days varying from 0° to 20°. The average depth of snow does not exceed 20 to 24 inches.

NEAR BIG SLIDE.

On May 11th the first camp of the season was made near Big Slide, 12 miles from Quesnel, and on the Fraser River. This slide extends back for a distance of about half a mile, rising to a height of 1,000 feet above the river. Strips of gumbo in the formation cause constant slides over an area of 700 acres. Opposite the slide there is a long point on which the land is level, though sandy, and covered with a fairly dense growth of cottonwood. Five parcels of land were surveyed here, two being pre-empted. While the point is only half a mile in width at its western extremity, the distance around it is 5 miles. On the north side of the river, up-stream from the Big Slide, I surveyed three parcels of land, two of which were pre-empted. The land on these parcels is brushy, and will cost about \$50 per acre to clear. Some of it is level; the soil is sandy loam. The only present means of access is by way of the river. •

SOUTH OF BIG SLIDE.

To the south of the Big Slide I completed the survey of the remaining Crown lands north of the Quesnel River, twenty-four parcels in all, six of them being pre-empted. A number of these parcels can be cleared of a fairly dense growth of cottonwood and fir at a cost of about \$40 to \$60 per acre. The land lies in benches where arable, and these are good for agriculture. The soil varies, being sandy and clay loam, usually free from rock. The subsoil is hard clay. In elevation the land extends from 1,500 feet at river-level to 1,900 feet. There are small creeks on Lots 6181, 6183, 6182, 6185, 6186, and 6192. In the months of May and June some water would be available for irrigation, and sufficient for domestic purposes can doubtless be obtained at all times. The land in this vicinity will be productive if taken up by the right class of settlers. It is all convenient to river, road, or trail, and lies within 10 miles of Quesnel. Of the thirty-two parcels of land surveyed in the territory heretofore described, nine were held



MAIN STREET, BARKERVILLE. 1863.



AN EARLY PHOTOGRAPH OF THE TOWN OF QUESNEL.

under pre-emption record, four have since been taken up, twelve others are suitable for settlement, while seven are of poor quality.

Contiguous to these surveys are two productive farms, that of Wilson and Steere on Lot 5012, and the Chinese Nam Sing Estate on Lots 85 and 502. Wilson and Steere show what can be done by a pre-emptor who is keen to become a farmer and willing to do hard work to accomplish that end. Four years ago they took up this land, which had been considered useless by the older inhabitants of the locality; they worked industriously at land-clearing, and have to-day over 20 acres in crop, with as much more practically cleared. The vegetables raised on this "useless" piece of land have taken first prizes at the Quesnel Exhibition. The Nam Sing Ranch is the only irrigated land in the neighbourhood. Here about 200 acres are under cultivation, growing hay, grain, and vegetables. There are some apple-trees which, while they have been badly neglected, still bear good fruit. Some hogs and cattle are raised. This ranch was taken up by the Chinese in the sixties, a splendid market being then available for produce at the goldfields of Williams and Lightning Creeks. It still supplies Barkerville's Chinatown.

VICINITY OF 10-MILE LAKE.

My next work consisted of completing the survey of lands in the vicinity of 10-Mile Lake, which lies at the head of a tributary of Barlow Creek, and 10 miles by road from Quesnel, along the route of the Pacific Great Eastern Railway. Fourteen parcels of land were surveyed here, four being held under pre-emption record; three of the remainder have since been taken up; one other is suitable for settlement; and the remaining six are of poor quality, though likely to be taken up on account of their proximity to the railway. Two settlers at the south end of 10-Mile Lake raise sufficient produce for themselves and their stock. The other places had been recently taken up and no improvements of any extent had been made. Around the lake the land rises in benches and the soil is clay loam. The vegetation consists of a moderately dense growth of jack-pine, willow, alder, and fir, which will cost \$40 to \$60 per acre to clear. There are gravelly patches throughout. North of the lake, along the Hixon Creek Road, the ground is mostly undulating, but level in places. It has been swept by fire, which left considerable windfall. The second growth is willow, with patches of jack-pine. There are marshy places, but the soil is mostly sandy and gravelly. While this ground will undoubtedly grow a certain amount of produce, I do not consider that it can be farmed profitably. However, on account of its contiguity to the railway, there is every likelihood of its being taken up in the near future.

TOP OF BIG SLIDE.

A half-section of land, lying 2 miles westerly from the lake, on an old trail leading to Cottonwood Canyon, was also surveyed to include the balance of the agricultural land between existing surveys and Big Slide. This land is covered with windfalls, resultant from forest fire, and is grown over with scattered willow. It could be cleared cheaply. The surface is rolling and the soil clay loam. Vegetables and grain would grow well and the land is well adapted to mixed farming.

VICINITY OF 10-MILE HOUSE, BARKERVILLE ROAD.

In this locality I surveyed thirty-two parcels of land, seven of which were held under pre-emption record. Of the remaining pieces, seven at least have since been taken up, and seventeen others contain enough good land to warrant the belief that they will be taken up. Viewing this land from the wagon-road, I thought it was too dry to be suitable for settlement, there being an absence of loam. However, excursions back from the road change the impression entirely. While the lot on which the 10-Mile House stands has been farmed to some extent for a number of years, the old-timers considered the locality so high and frosty as to be worthless, although the soil is a clay loam, and the vegetation in most places north of the road a light growth of poplar, which can be cleared for \$20 to \$40 per acre. On the poor land the vegetation consists of fir and jack-pine. The general altitude is 2,400 feet. Two pre-emptors have cleared and cultivated a few acres this year, planting oats, potatoes, and vegetables, and their crops, while naturally not as far advanced as those at lower altitudes, looked healthy. These settlers have since told me that the crops were better than they had anticipated for the first year of cultivation. I expect to see a good mixed-farming community here in a few years. Water for domestic purposes can be obtained from some creeks, and from indications should be obtainable by digging wells on all the parcels.

Following along the Barkerville Road from this land, an altitude of 3,000 feet is soon reached, and the land becomes poor, being broken and stony and more heavily wooded. At the 13-Mile House, to which I made a tie by traversing the road, there is a meadow, and hay, oats, and vegetables grow quite well.

VICINITY OF HOLT'S.

As the surveys required west of the Fraser River, near Baker Creek, appeared more urgent than any farther ones beyond 10-Mile House, I moved camp to Holt's, west of the Fraser River, 4 miles from Quesnel. Here forty-nine parcels of land were surveyed, five being held under pre-emption record. Two more have since been taken up. Of the remaining pieces, thirty are fit for settlement and the remaining twelve of little value. These surveys include all the vacant land between previous surveys and the Fraser River, north of Baker Creek.

On a number of the parcels there is considerable hillside, the difference of elevation between the lots along the river and those on the uplands being 900 feet. Over the whole area the soil is variable, that on the land classified as first class being clay loam, 8 inches or more in depth. The subsoil is mostly hard clay. On the balance of the land there is considerable sand and gravel. The vegetation consists mostly of poplar, which will cost between \$30 and \$60 per acre to clear. There is some pine and fir. Near Bouchie Creek there is quite a heavy growth of fir on the hillside, and logging for local use has been done here. Some of the lots overlap timber limits to a slight extent, and the timber on these is heavy for this district. However, a cruise, made according to British Columbia scale, shows the average nowhere to exceed 4,200 feet per acre on the surveyed lots.

Grain and vegetables grow well on this land. Water for domestic use can be obtained on most, if not all, of the parcels from creeks, springs, or wells.

Spring Farm (Fletcher & Holt) and Columbia Ranch (Stebler & Bauer), lying near the Fraser River and adjacent to these surveys, are among the most productive farms in the district. The lots lie close to the Fort George and Nazko Roads and are all easy of access. Two front on the Fraser River.

Near the junction of the Fort George and Nazko Roads, 6 miles from Quesnel, lies Bouchie Lake. Two miles westerly lies another lake, named by some one of an original turn of mind "Trout." These lakes are the paradise of the local disciples of the late Mr. Walton, being the ancestral home of rainbow trout of large size.

NAZKO ROAD.

The Nazko Road, which is constructed for some 30 miles from Bouchie Lake, and continued by trail to the settlement in the Nazko Valley, passes through a stretch of fairly good land. To continue the surveys in this locality I camped at a spring 14 miles from Quesnel, locally known as "Hangman Spring," to commemorate the method of suicide chosen by a camp cook there several years ago.

From this camp I surveyed twenty parcels of land, two of which were held under pre-emption record. Twenty-one of the other parcels contain a percentage of good land, while the other three are worthless. On the good land the soil is clay loam and the vegetation a light growth of poplar. The cost of clearing would be \$30 to \$40 per acre. The surface is level and rolling, with no large hills, and the average elevation 2,500 to 2,700 feet. The balance of the land is sandy and stony, with a light growth of poplar and jack-pine and some fir and spruce. The settlers will have to depend on wells for a domestic water-supply. The land is fairly well adapted for dairying and mixed farming, but, as there is better land obtainable in the district, it will not likely be settled to any extent for several years. Grain and vegetables will grow quite well.

I completed the season's work by making a tie to some surveyed lot farther along the Nazko Road. The land along this tie is similar to that surveyed.

As far as time would permit, during August and September I made trips into parts of the district not connected up or reported on by surveyors heretofore, in order to supply the information you had requested for adding to the pre-emptors' maps. As no description of these portions of the district has been published in departmental reports, the following notes should be of some value.

QUESNEL-BARKERVILLE ROAD.

After leaving the 13-Mile House the road descends gradually. There is a little fair land near 15-Mile Lake, but generally the surface is hilly and stony, wooded with fir and jack-pine. Nineteen miles from Quesnel the valley of the Cottonwood River is reached, at an altitude of 2,400 feet. Cottonwood consists of a farm-house which does duty as a stopping-place, store, post and telegraph office. The land here is mostly owned by the John Boyd Estate. It is very productive, hay, grain, and vegetables being grown. The stock on this ranch consists of horses, cattle, and sheep. A pedigreed ram, the first to visit the Cariboo, has been recently imported by Messrs. Boyd. Some new pre-emptions have been taken up in this locality. Pack-trails from Cottonwood lead to Willow River and Quesnel and Swift River Valleys.

Three miles above Cottonwood the river branches, one valley continuing eastwards and the other branching to the south. The former takes the name of Lightning Creek and the latter of Swift River. Only to the stream from this fork to the Fraser River is the name Cottonwood applied.

On Victoria Creek, a tributary of Swift River, there is a considerable area of good land, lying at an altitude of 3,000 feet. This is largely surveyed and alienated.

Five years ago considerable money was spent to convey the water from Swift River to the gold-bearing gravels of the Quesnel River, for which purpose a large flume and siphon was built, and the huge head of water obtainable enabled hydraulic operations to be conducted very economically. However, the venture seems to have been unsuccessful.

SUMMER RANGE.

It is justly stated that the best beef in British Columbia can be obtained in Barkerville. The rounded hill-tops near by are covered with a species of vetch which, for a few months in the year, is a perfect feed for beef cattle. The beef is fat and tender. A certain amount of wild hay is cut in meadows on Williams Creek. The altitude of Barkerville is 4,180 feet.

ROADS AND TRAILS.

From Barkerville, Stanley and Beaver Pass trails lead to various mining claims. A road recently constructed leads from Barkerville to Bowron Lake, 20 miles distant, and 1,200 feet lower than the town. From this road trails lead to 30 miles down Bowron River and to Goat River and the Upper Fraser Valley.

BOWRON RIVER.

On the upper portion of Bowron River and its tributary, Indianpoint Creek, there is a stretch of good land, and at least five settlers have located on it. The valley is quite open and the soil of good quality. The whole country is at present well stocked with bear, moose, and caribou, which fact attracts hunters annually from New York and England. Grouse are numerous. There is good trout-fishing. Trappers in this locality secure good catches of marten, mink, beaver, and muskrat.

The agricultural value of this land will depend on whether the Barkerville mining camp revives, as it is the only market.

VICINITY OF ALEXANDRIA.

To the east of the Cariboo Road, near Alexandria, several hay meadows have been taken up as pre-emptions and leases. This locality is the favourite summer range of the stock kept by the various ranches. Near Alexandria there are several big ranches on both sides of the Fraser River and a great many pre-emptors have taken up land.

COAL-SEAMS.

In the neighbourhood of the Australian Ranch, on the Cariboo Road and the Pacific Great Eastern Railway, 20 miles from Quesnel, coal-seams have been discovered, underlying some eight sections of land. This coal is sub-bituminous, low in ash. It has been used in the neighbourhood as a domestic coal and is considered good. Its proximity to the railway will enhance the value of the mine, which will in all probability be largely worked within a few years.

HEADWATERS OF MELDRUM CREEK.

A trail from Riske Creek Post-office, on the Chilcotin Road, leads through the upper valley of Riske, Meldrum, and Mackin Creeks to hay meadows. Along this trail there are a few

thousand acres of land on which the soil is good, where settlers have located and grown nice-looking crops. This land lies in the vicinity of Callanan Lake, near the Dome, a small peak which stands out prominently above the surrounding undulating plains. The settlers here are raising cattle and horses, growing stock-feed and a little garden produce. On the head of Meldrum Creek are four lakes fringed with hay meadows. Of these lakes the two best are Callanan Lake and another unnamed lake 3 miles long, which reaches within half a mile of Lot 109, on Mackin Creek. At this point there is a strip of level country, 20 chains wide, between Mackin and Meldrum Creeks.

MACKIN CREEK.

The best wild-hay meadows in the district lie along Mackin Creek and are owned by R. C. Cotton, of Riske Creek, and Yorston Bros., of Australian Ranch. These meadows have an annual yield of about 1,000 tons of hay. Yorstons' meadows are reached by a rough road from Soda Creek.

Apart from these hay meadows the land along Mackin Creek is of poor quality. That near the head of Meldrum Creek and southerly toward the Chilcotin affords good range for stock. Throughout this section of the country deer, ducks, willow and blue grouse, and fool-hens are quite plentiful. There are beaver in the creeks and lakes. Trout are abundant in all.

MACKIN CREEK TO ALEXANDRIA.

Between Mackin Creek and Alexandria, a few miles west of the Fraser River, there are numerous small meadows of 40 acres and less. These lie chiefly on various branches of Tingley and Narcosli Creeks. The land, apart from these and Narcosli Valley, is rocky. An old road leads from Lot 103 to Webster's, at Alexandria, but it is now difficult to follow.

VALLEY OF BAKER CREEK.

For a few miles beyond Puntchesakut Lake, on Baker Creek, and 30 miles via the Nazko Road from Quesnel, there is a good district for settlement. At the present time about twelve pre-emptors are located here on wild-hay meadows. The average elevation is 2,700 feet. This area seems well adapted for dairying, cattle and hog raising. It is fairly open, partly burned, and has a good amount of summer feed, chiefly grass, peavine, and vetch.

EXTRACT FROM THE REPORT OF D. B. MORKILL AND G. S. BOULTON.

DATED OCTOBER 31ST, 1914.

[Messrs. Morkill and Boulton were employed in 1914 by the British Columbia Government in making surveys in the vicinity of Eaglet and Hansard Lakes.]

The lands surveyed this season lie immediately along the Grand Trunk Pacific Railway on what is known as the "Cut-off," where (at Hansard Station) the railway leaves the Fraser River, which it has followed closely in its general westerly trend in the upper reaches, and cuts off the big bend to the north containing the Giscome Rapids, rejoining the Fraser again near the junction of the Willow River. These lands extend from Mile-post 1237 to Mile-post 1249 on the railway. The distances are reckoned westerly from Winnipeg and appear in the Grand Trunk Pacific time-tables; they are also marked by posts along the track.

The present travelling-time by railway from Prince Rupert is twenty-four hours, and from Edmonton approximately the same, which running-time will, no doubt, be reduced with further operation of the road.

Willow River (Mile 1260) is at present the nearest post-office to the west, and McBride (Mile 1135), the railway divisional point, the nearest on the east. Prince George is reached in about two hours and McBride in five hours and a half. These towns, together with lumber-mills along the river between them, of which there should be a number operating in the near future, will be the natural local markets for the produce of the district, and the older centre will also be available when production is made on a larger scale.

Lumbering will probably become the main industry along the Fraser River, and there is throughout its valley a great quantity of timber waiting to be manufactured.

The summer climate is temperate, though winter conditions are naturally somewhat more rigorous than in the southern parts of the Province. There were no summer frosts observed this season, and those settlers of whom inquiries were made state that they do not occur in this section. First frost recorded was on September 1st. Snow generally falls to stay about Christmas, though there are flurries off and on from the middle of November. In late December, January, and the first part of February it falls heavily, generally reaching a depth of 4 feet. The average winter temperature is about 5° below zero, the extreme being 40° below, which occurs about the second week in January. As a rule, snow disappears during April. The heaviest rainfall occurs during the months of June and July, August and September, being generally fine and clear.

Of the land surveyed, a strip along the railway about a mile wide is flat, at a mean elevation of 2,000 feet above sea-level. This strip is largely made up of willow-swamp formed by beaver-dams, with patches of open peaty bog. The swampy nature of this strip is now changing owing to the construction of ditches along the right-of-way, which are draining it to good advantage, and could easily be further improved by destroying the numerous beaver-dams. Some dams were noted fully 10 feet in height, but these are easily broken with a small amount of work. The soil is black loam in the beaver meadows and peaty in the open patches, with clay and silt subsoil, and should be profitably used for general farm produce, to the growing of which it is well suited. Clearing would cost in the neighbourhood of from \$15 to \$30 per acre. There is abundance of water for all purposes, brought by numerous small creeks from the higher land to the south.

This strip along the railway contains a number of small lakes, the principal ones being Hansard (2 miles long), Aleza (1 mile), and Eaglet (6 miles). A small lake near Mile-post 1245, known as Summit Lake, divides the drainage flowing east and west to Fraser and Willow Rivers respectively.

To the south of the railway-flat the ground rises about 200 feet over slopes timbered with spruce and balsam and patches of birch (averaging about 3,000 feet B.M. per acre) to a practically level plateau draining to the Bowron River. This plateau extends beyond the limits of the survey and is of the same nature as to timber and soil as the portion surveyed. The soil is a good clay loam with clay subsoil, well suited to mixed farming when cleared of its timber, which is scarcely of milling value except on a few sections.

An estimate of the probable cost of clearing this land for the plough, given by settlers who have made considerable improvements, puts it at \$150 per acre. When once cleared this land should give excellent results, as the soil is especially good—fully equal to that along the river-flat. The results obtained by those settlers who have planted garden-truck, etc., show what success may be had in this district. Three men farming 7 acres on the Fraser near Hansard Lake report that during the 1913 season they grew produce to a value of \$3,000. The construction-work under way at that time, of course, created a ready market for them, but their experience serves to show what may be done.

To the north of the railway the ground continues flat to the bank of the Fraser as far west as Hansard Lake. West of this lake the ground rises gently to the north for a distance of about 3 miles, to an elevation of approximately 2,350 feet above sea-level, whence it again falls to the Fraser River, which is here about the same elevation as the railway (2,000 feet).

On this southerly slope the soil remains a good clay loam, except on the divide, where it becomes sandy and gravelly and has been burned over some years ago. The slope is timbered lightly with spruce and patches of easily cleared poplar and alder. The cost of clearing the spruce on this side of the railway would be somewhat less than on the south. The soil offers the same advantages for general farming.

GAME.

There is a quantity of wild game in the country, moose, caribou, and black bear being frequently seen. The beaver and muskrat are everywhere, but other fur-bearing animals are not plentiful. Willow-grouse and spruce-partridge are fairly numerous, as are also ducks and geese in the autumn. Eaglet and Hansard Lakes are well stocked with rainbow trout and offer good sport to the fisherman.

It is believed that this country is specially adapted to settlement in small holdings of, say, 20 acres. As already stated, a large part of it is wooded, and the probability is that a settler on 160 acres would never make economic use of more than the lesser area. The soil is such that proper attention to the cultivation of 20 acres would provide an excellent income, and would furnish all the occupation the ordinary family of settlers is capable of. A settlement

of the country on some such plan would, it is believed, be advantageous in many ways, would concentrate the settlers, provide more opportunity for their mutual assistance, and obviate the necessity of much road-building.

EXTRACT FROM THE REPORT OF J. A. WALKER.

DATED NOVEMBER 11TH, 1914.

[Mr. Walker was employed in 1914 by the British Columbia Government in making surveys on the Upper Fraser River in the vicinity of McBride.]

The South Fork of the Fraser River rises in the Yellowhead Pass, in the Rocky Mountains. It flows westerly through a very rugged and mountainous country to a point near old Tete Jaune Cache, where the valley lands commence. The river assumes a general north-west trend to the confluence of the North Fork, where it gradually swings to the south.

Westerly from Tete Jaune Cache, the Fraser follows an extremely winding course, its length easily being double that of the valley. It varies in width from 100 to 200 yards and has a current from 2 to 7 miles per hour, averaging about 3 miles. The high-water mark reaches a height up to 10 feet above the low-water stage. This, of course, varies with the width of the stream. In summer its rise is very rapid, but its decline is more gradual. The river drops from an elevation of 3,720 feet above sea-level at the Yellowhead to about 1,850 feet at Prince George, in a distance of about 375 miles by river. Between these points the valley is traversed by the Grand Trunk Pacific Railway. The Canadian Northern Pacific Railway also enters the valley by the Yellowhead Pass, but it strikes south from near old Tete Jaune Cache.

Although there are a few obstacles to navigation, the river was extensively used by all manner of water-craft, from stern-wheeled steamers and power-boats to scows, canoes, and rafts, during the construction of the railway. This condition is now entirely a thing of the past. The railway is the medium of transportation. While there is a lift span in the railway-bridge at Prince George, the two low-level bridges at up-stream points bar the large steamers formerly navigating the river.

The past season has seen a start towards the settling-up of the valley. The Government threw open about 80,000 acres of land and a great rush resulted, about 175 pre-emptions having been filed upon. All summer clearing land and building cabins have been the chief industries of the valley. A splendid type of settlers, by far the majority of whom are English-speaking, has come in. There are no Indians in the valley from Tete Jaune Cache to the Fort George Indian reserves.

CLIMATE.

Climatic conditions in the valley are very similar to other points in the Interior of the Province, with the exception of the summers, which are as a rule rather wet. Thunder-storms occur throughout the valley, but they are neither severe nor frequent. The first sign of spring is the break-up of the ice in the river. This occurs about the middle of March. After the first flood the river subsides, but after the first of May it begins to rise again and does not go down until after the middle of June, when high water is noted. April sees the entire disappearance of snow in the valley, and after the first of May the trees begin to bud. By June the wild flowers appear. The summer evenings are usually cool and are very bright to a late hour. Light summer frosts are known, but this year none were noted until the end of August (32°). July and August of this year were unusually pleasant, very little rain having fallen. A characteristic feature of the autumn months is the high wind which blows up and down the valley. After a wet period this wind is a great factor towards drying the soil from a superabundance of moisture. About the middle of November "frazzle-ice" begins to run in the river, and about a month later the lowest stage of water is reached. The river does not freeze over until about the middle of December, and in January it is sufficiently safe for freighting purposes.

There is not much of a snowfall until after Christmas. In the valley the initial fall usually occurs in the first half of October, and it comes to stay about the end of November. In the vicinity of McBride, a comparatively open country, the depth is a little over 2 feet. The most remarkable feature of this locality is that, though in an open country, the snow does not drift. This may be explained by the fact that the wind is more or less of the "Chinook" variety. This keeps the snow moist and heavy. This phenomenon is considered a very good feature, as the ground is thus seldom exposed to the frost.

To the average Canadian the winters are ideal. They are cold, but not the continuous rigorous cold that one experiences in the Prairie country to the east. The usual winter temperature ranges from 20° above to 10° below, averaging, perhaps, above zero. Very fine bright weather prevails throughout the whole winter. The minimum temperature occurs in January or February and lasts only about a week or two. From 30° to 45° below zero has been experienced.

McBRIDE.

McBride, named in honour of British Columbia's Premier, is the first townsite on the line of the Grand Trunk Pacific Railway in British Columbia. It is situated at Mile 90, reckoned from the summit at Yellowhead Pass—the Interprovincial Boundary-line—about 2½ miles south-east of Dore River and about three-quarters of a mile south-west of the Fraser River. It is essentially a "railway" town. The railway company has built up a fine divisional point, both for passenger and freight service. The physical features of McBride are such that would lend themselves to a large lay-out, and the faith of the company in the future of the traffic and the town is well shown by the immense amount of work done here. A very large station, 8 miles of tracks in their yards, a twelve-stall roundhouse, machine-shops, freight-sheds, and all the requisites to make up a fully equipped railway terminal are here found. The station and yards are electrically lighted. Water is stored by a dam across a small creek above town, and the pressure is maintained by a large water-tower. At present there is no water system other than that delivered by water-carts to the householders and supplied by the railway company.

During the past summer the streets were graded and improved somewhat. A great deal of sidewalk has been put down by private property-owners. An air of permanency and faith in the future is shown by the number of new substantial buildings that have been erected in the year of McBride's existence. Nearly every business found in the small country town is represented. There are three or four well-stocked general stores, and also drug, butcher, hardware, clothing, grocery, and numerous other smaller stores.

There is quite a large hotel at present and another about to be built. With several rooming-houses and restaurants, the travelling public are well catered to. The Provincial gaol and police headquarters for the district are now being built. With several halls and a small theatre, the inhabitants are not entirely lacking in entertainment. There are also a school-house and a church.

The post-office, established last April is a boon to the community. Mail arrives three times a week. Recently through mail service to Prince Rupert was inaugurated.

For most of the year there was a daily train to Edmonton and a tri-weekly service to Prince George. At present there is a tri-weekly through service, including Pullman sleepers and dining-cars, from Edmonton to Fort George, and a bi-weekly service to Prince Rupert.

The trip from Edmonton to McBride (345 miles) is made in about sixteen hours, and from Prince Rupert in about thirty hours. The fare from Edmonton to McBride is \$12.55; from Vancouver via Edmonton, \$44.30, and via Prince Rupert, \$42.50. With the completion of the Pacific Great Eastern and the Canadian Northern Pacific Railways, the time and cost of the trip from the Lower Coast will be very much reduced. The freight rate, Edmonton to McBride, averages 1 cent per pound.

The population of McBride during the past summer was about 500. The elevation is about 2,360 feet above sea-level.

McBRIDE AND DORE RIVER DISTRICT.

In this district the Fraser Valley is between 3 and 4 miles in width. The mountains on either side rise to a height of 7,000 to 8,000 feet above sea-level. It is a very attractive country, and from an agricultural view-point it is the most desirable of any in the valley. With little exception, the timber in the bottom lands has been burnt off many years ago.

East of the Dore the land lies mostly on the south side of the Fraser and is on a bench from 50 to 100 feet above, with a gradual slope towards the river. The subsoil is clay, with a top soil varying through rich peaty soil, sandy loam, and clay loam to clay. It is covered with a small growth of red willow, alder, poplar, cottonwood, and birch. It is also covered to a large extent with windfall. On the mountains to the south the timber consists chiefly of large cedar, considerable of which is hollow, spruce, balsam, hemlock, jack-pine, and scattered fir. The Grand Trunk Pacific follows a course about half-way between the river and the foot of the mountains. There are a few beaver-swamps and sloughs, but these could be easily drained.

There is a considerable area of swampy land and muskeg north of and adjacent to Horseshoe Lake, about three-quarters of a mile south-east of McBride. Some of this area could be drained, but some of it will always be flooded by backwater from the Fraser during high water. The lake proper is about a mile long and 10 chains wide. It is very popular in summer for boating and bathing. The bench south of the lake is from 30 to 40 feet above it. Though not swampy, there is quite a bit of surface water held up by the heavy clay. This may be easily drained off. Towards Dore River there are some small gravelly ridges.

NORTH SIDE OF THE FRASER.

On the north side of the Fraser there is a narrow strip of land from a quarter to a half a mile in width between the river and the foot of the mountain. In general, this land lies upon a bench from 15 to 30 feet above the river. The subsoil is clay; the top soil varies from clay and clay loam at the river to chocolate loam and sandy loam towards the mountains. Here there are considerable rock and boulders. It is covered with a small growth of red willow, alder, poplar, and birch and standing dead cedar. Some large cottonwoods grow along the river-bank. There is also some windfall throughout the area. The inaccessibility of this land, as compared with the land on the south side, is somewhat offset by its apparent productiveness. With a southern exposure, such as it has, the vegetation is very luxuriant.

WEST OF DORE RIVER.

To the west of the Dore it is more broken up and higher in regard to bench land. The soil is more varied than that upon the east. On the north-west bank of the Dore and commencing a little less than a mile from the mouth there are large gravel-beds. A great quantity has been used for ballasting the railway. Considerable of it, however, is somewhat large for that purpose. As the gravel runs out sandy clay and "gumbo" are found. The bottom land is sandy and clay loam on gravel subsoil. It is good land and is covered with a small stand of poplar, spruce, and balsam. At the mouth of Dore River there is a considerable stand of good timber consisting of spruce and balsam.

As a general rule, gumbo clay is found upon the bench land and sandy and clay loam in the bottom land. The latter would appear to be better adapted for vegetable and fruit growing. The chief drawback to the bottom land along the river is the fact that it is liable to undulation during high water.

The clay upon the bench land grows excellent grasses and fodder. However, when this land is cleared and cultivated and the clay subjected to the disintegrating influences of the sun and frost, there is little doubt but that it will also grow vegetables well. There does not appear to be any alkali present, except possibly slight traces in old beaver-swamps.

WELL ADAPTED TO TRUCK-GARDENING.

Throughout the district small fruits grow very luxuriantly. In July, wild raspberries, strawberries, and gooseberries grow in abundance and ripen well. Blueberries, huckleberries, and, in the higher ground, cranberries are also found. There can be but little doubt that cultivated fruits, as apples, pears, and plums, would thrive very well.

This district seems to be well adapted to truck-gardening. Potatoes have been grown for the past few years by squatters with phenomenal success. Turnips, carrots, beets, radishes, onions, parsnips, peas, and lettuce grow remarkably well.

Timothy, oats, and rye have done well where they have been tried. Peavine and various grasses grow in the open places.

Throughout the growing season the valley is a bower of bloom of all colours. About fifty specimens of flower and plant life were collected and sent to the Provincial Botanist. These have been assorted and mounted in the Provincial Herbarium. To quote from Mr. Davidson, the Provincial Botanist, in regard to his report on the nature of the country as indicated by its flora:—

"The collection as a whole is very similar to the flora of many districts around Vancouver, and this is somewhat remarkable when one considers that the McBride District is approximately 4° farther north and that the specimens have been collected at an altitude of between 2,000 to 3,000 feet.

"There are several points of interest. First, the entire absence of muskeg and swamp plants in the collection. Second, the absence of plants indicating bare rocks or rocky ground

with shallow soil. Third, the vast majority—namely, 90 per cent.—of the specimens belong to good soil of a fair depth; 36 per cent. of the specimens indicate that the soil was rich in humus and well suited for agricultural purposes; 12 per cent. of the specimens have been taken from situations where the soil was fairly open, well drained, and with less humus, soil which could, with a liberal application of manure, be of great value, either for farming or, preferably, truck-gardening.

“Regarding the climatic conditions, one would judge from the flora that these are very similar to the conditions in the neighbourhood of Vancouver, although one or two plants in the collection suggest that they have been brought from an environment where there was a shorter growing season, while a half dozen others are indicative of long growing season or sheltered localities.

“You will observe on the list a number of plants (five) known to the botanist as weeds. These have been introduced through the agency of man, and do not belong to British Columbia native flora.”

MARKETS.

With the present railway transportation facilities and a ready market so close on the Prairie, the settler will be well repaid for his efforts. When highways are built the local markets will also be an attraction. A small experimental farm run under the combined auspices of the Government and the railway company would be of very great value to the community in demonstrating what could be done in this district by correct methods of farming.

LAND-CLEARING.

There is but little or no heavy timber. The most of the land can be cleared for \$20 to \$50 per acre. With the proper equipment, or if done on a large scale, it should be done for much less. The chief difficulties, according to the experience of settlers during the past season, have been with the red willow, with its long running roots, and partially rotted windfall. It might be well to remark that, with the clearing and draining of the land, the large number of mosquitoes, now so prevalent and troublesome in the hot weather, will no doubt be greatly reduced.

IRRIGATION.

The question of irrigation is problematical. Opinions are varied, but from observations, while it might possibly be to the advantage of a crop to receive moisture during a dry season, it would appear that no elaborate system of irrigation is necessary. Besides the larger rivers, there are numerous small creeks running the year round to furnish water to the settlers. The sinking of wells in the clay soil near McBride, while water has been struck in some cases, has not been very much of a success. Where gravel is found this state of affairs is different.

WATER-POWER.

The only river of note, other than the Fraser, is Dore River. It has a current of from 2 to 4 miles per hour and a flow of about 500 cubic feet per second in an average stage of water. When it enters the Fraser Valley it becomes very crooked. Where it nears the Fraser it is corroding the banks, and each year considerable good bottom land disappears. The same may be said of the Fraser in several places in this locality. Probably the only effective way to stop this would be to mattress the banks affected with brush and rock. The Dore would apparently be more adapted for a town water-supply than for a source of cheap power.

Across from Dore River and about a mile up the Fraser are Sunbeam Falls. Across from McBride are Sundance Falls. These are, however, of very small flow—though they have considerable head—and are liable to freeze up in winter. They are more of a scenic than a commercial value.

GAME.

As the country is now being settled up the game is gradually disappearing. Though it is not as plentiful as formerly, there is considerable left. Moose, caribou, and bear abound. Deer are unknown. Beaver are very plentiful and have made themselves more or less of a nuisance through flooding good land. Rabbits are also so plentiful as to be a serious menace to garden crops. Extra precautions in the way of wire fencing have to be taken. Grouse of various kinds are plentiful. Ducks are not very prominent and geese are scarce. Coyotes are very much in evidence. Marten, mink, ermine or weasel, and skunks are the most common of the fur-bearing

animals. Owls and hawks are very common. On the north side of the Fraser especially, bush-rats were very plentiful. Several varieties of trout are found in the streams, but there seems to be a scarcity of fish in the Fraser.

MINERALS.

Although the country surrounding McBride has been well prospected, no mineral-deposits of note have been discovered. A great amount of mica and mica-schist is in the country's formation, as may be seen from the presence of mica in the river-silt.

INDUSTRIAL POSSIBILITIES.

To attempt the prophetic rôle in the matter of industrial possibilities would be useless until one knows of the real agricultural value of the district. At present there would appear to be a good opening for a small lumber-mill near McBride. With good standing timber at the very door, all the lumber, up to the present, has been shipped in from the Prairie.

Mixed farming and fruit-growing will no doubt become the general industries. These will in their turn, of necessity, create new industries of various kinds.

The heavy clay, found in such large quantities, might be turned into a commercial use in the manufacture of drain-tile and brick.

At present there are no highways in the district. The lack of them is keenly felt by the settler, who is now labouring under difficulty. However, the Government has promised him relief, and the settler is looking forward to a trunk highway and a few ferries next year. At present the only means of access to the various pre-emptions is via the river or the railway; be it said for the railway company that it has been very considerate towards the settler and has helped him in innumerable ways.

EXTRACT FROM THE REPORT OF F. P. BURDEN.

DATED NOVEMBER 12TH, 1914.

[Mr. Burden was employed in 1914 by the British Columbia Government in making surveys on the north side of Nechako River to the west of Prince George.]

PHYSICAL CHARACTERISTICS.

The country may be generally described as a level or gently rolling bench, lying about 500 feet above the level of the river. The rise from the river to this bench is rather abrupt, so that, in viewing it from the river, one gets the impression that the land is exceedingly rough and steep; but the edge of the bench is to be reached at a distance of from 30 to 80 chains from the shore. In the latter instance two or three small intermediate benches are usually encountered on the way to the top. The most marked exception to the general level character of the country is to be found in the north-easterly part of the area. In this locality there are about eight sections made up of a succession of ridges and corresponding valleys, in many of which are to be found small lakes without apparent inlets or outlets, but whose waters are clear and fresh. In this part the ridges are gravelly and their sides very steep, but the soil in the valleys is of good quality.

MEANS OF ACCESS.

The easiest means of access to this part of the country is at present by the Grand Trunk Pacific Railway, which skirts the southern bank of the Nechako River. Stations (at present only flag-stations) are provided at an average distance of 5 miles. During the months of high water, May, June, and July, the river is navigable for big boats, and for a longer period by those of more shallow draught. There are, however, two rapids, one known as the Chilako or White Mud, and the other as Isle Pierre, where it was found necessary to line the heavily laden boats of the railway contractors, although high-powered gasoline-boats go through without such assistance. No wagon-roads as yet tap this area, though connection with the existing road which extends about 10 miles west of Prince George could be easily made, a ferry being all that is necessary to make the crossing into the territory under discussion. This will be a necessity in the near future, as the easterly and southerly part of the area surveyed is being rapidly taken up by pre-emptors. At present the nearest local market is that of Prince George.

INDUSTRIES.

The only industry in the district at present that amounts to anything is lumbering. There are three small mills, one in Fort George and two in South Fort George, with a joint capacity of about 100,000 feet per day. Mining during the past summer has received considerable attention, there being some promising prospects now in course of development. Noticeable among these is a free-gold proposition immediately west of and within 5 miles of Prince George. A large number of claims have been staked and good assays obtained where ledges have been uncovered. Work on one group is now going on, and some work has been done on a group north of the Nechako and a few miles to the east of the block surveyed. On what is known as Coal Creek, a small stream emptying into the Nechako from the south, and about 12 miles west of Prince George, prospecting for coal has been carried on, with the result that two or three seams have been uncovered; one, it is stated, having a depth of 13 feet. It remains to be seen, however, whether this coal will be of value commercially, as development-work was stopped on the outbreak of the war.

Clay suitable for the making of brick is found in several places, there having been three different yards in operation at various times during the last three years in the vicinity of Prince George. Lime has also been manufactured on a small scale at a point on the Fraser River east of Prince George.

SOIL.

In general, the soil is a sandy loam. There are occasional gravel ridges, but on the whole the soil is good and is remarkably free from stone. In the southerly portion there are considerable areas of clay loam. The work done by farmers in the adjoining localities tends to show that the country is admirably adapted for mixed farming. Crops of vegetables remarkable for both quantity and quality are grown, while hay and grains also do exceedingly well. Small wild fruits, such as strawberries, raspberries, and blueberries, are found. Experiments with the cultivated varieties of the two former show that they can be successfully raised.

To my knowledge, only a very few apple-trees were ever brought into the country, and these at a time when goods had to be shipped in over the Cariboo Trail from Ashcroft. These trees were in bad shape when they arrived, and as no particular care was taken of them they did not flourish. I believe, however, that the hardier variety of apples can be grown here to advantage, as, on the whole, the climate is somewhat similar to that of New Brunswick and Nova Scotia, although there is generally a short period during the winter when the thermometer registers a greater degree of cold, but the period is of short duration.

The country is dotted with lakes, but very few creeks flow into or from them. Bordering on these lakes there are usually meadows, most of which are wet and are producing wild grasses of very little value for feed. Some of these could be easily drained, as a good deal of the water is kept in place by old beaver-dams. Most of them seem to consist of masses of roots and vegetable matter, on top of a very hard blue-clay stratum. Until one is actually drained and an attempt made to utilize it, their value is questionable.

Owing to the facility with which hay, grain, and roots can be grown, cattle-raising can be made profitable, especially at prevailing prices for beef. But to be kept in proper shape cattle would have to be fed from the first of November to some time in April.

TIMBER.

Practically the entire area, with the exception of the meadows referred to, is wooded. But the timber can hardly be said to be valuable, as there is not sufficient of merchantable quality in any one place to pay for putting in roads for removal. In the central portion there is considerable tie-timber, but were there a market for pulp-wood in the vicinity the whole block would be more or less valuable, there being a good percentage of poplar and spruce present. In this connection it is possible that the rapids on the Nechako could be utilized as a source of power, which would be a great aid to such an industry.

The cost of clearing runs from \$50 to \$100 per acre; that is, putting the land in shape to plough. In this estimate men's wages are reckoned at the prevailing rate of \$3 per day, plus living expenses.

CLIMATIC CONDITIONS.

Rainfall from the beginning of April to the end of October has been abundant, it being heaviest during June, July, and September. I have known it to become very dry during August

and September, but the past two seasons have been rather too wet. Snow usually begins to fall in November, though in 1913 there was not sufficient for good sleighing until late in January. It may be said to last until the latter part of April, and some is to be found in heavily timbered sections in May. At the present writing there is no sign of snow, and until last night there was no frost in the ground.

Under present conditions—that is, with so little land actually cleared and cultivated—summer frosts are to be expected; but for the last two years they have done practically no damage. So far, the main crops raised are potatoes and other vegetables, and I have yet to learn of a case where these crops were actually destroyed or even very badly damaged from effects of frost.

Although the length of the season between time of planting and harvesting is of short duration, the length of the daylight period, together with the amount of sunshine, is so great it has been found sufficient to bring to maturity all the crops mentioned.

The winter may be said to begin in November and end in April, but apart from an exceptionally cold wave, lasting usually from ten to twelve days, it is a winter of bright sunshiny days and clear cold nights. Snow varies in depth from 2 to 3 feet, but there is great difference in the amount of snowfall in localities separated from each other by very short distances.

GAME.

Moose, deer, and bear are well represented, though not what I would call plentiful. This area has been for years a close and therefore favourite hunting-ground for the Indians living at Fort George. Signs of beaver are everywhere apparent, old dams and the ruins of houses, but very little fresh work was seen. As many as five deer in a herd has been seen, but usually so much noise is made by falling trees, etc., that there is very little chance of seeing game, even in a well-stocked country.

Among the fur-bearing animals are beaver (now practically extinct in this area), marten, mink, and muskrat. These latter, together with weasel, appear to be plentiful. Rabbits are numerous and also coyotes, but their pelts are not of much value. Grouse and ducks are plentiful, though the latter do not breed there to any great extent.

EXTRACT FROM THE REPORT OF T. A. McELHANNEY.

DATED NOVEMBER 20TH, 1912.

[Mr. McElhanney was employed in 1912 by the British Columbia Government in running the line of the 124th meridian of longitude from the 55th parallel of latitude to the foot of the Rocky Mountains.]

BETWEEN THE 55TH PARALLEL AND NATION RIVER.

The divide between the Arctic and Pacific drainages was crossed about $2\frac{1}{2}$ miles north of the 55th parallel of latitude. The elevation of the range at the highest point of crossing of the meridian was 4,690 feet. The elevation decreases rapidly in the next 3 miles till an undulating area of an average elevation of about 3,500 feet is reached. This runs to within about half a mile of the Nation River, the elevation of which is 2,705 feet. It is drained by a creek running in a direction almost parallel to the line and on the east side after crossing the line about 5 miles north of the 55th parallel. A high broken range, terminating in Milligan Peak at the north, lies between the 124th meridian and the Manson Creek Trail. There is another range from 6 to 10 miles east separating this drainage from the Robinson Creek drainage, which flows in the same direction, emptying into the Nation River.

The land is too high for general agriculture. It is dotted with small lakes and meadows and drained by numerous small streams. Beaver have been active on these streams and have dammed a great many of them, resulting in some very fair meadows.

The timber is, in general, jack-pine. There are a great many muskegs and spruce bottoms, which rendered trail-cutting a difficult and time-consuming labour. In fact, for the first 35 miles of the line the time spent on the trail was almost equal to that spent on the line. In one move

of 7 miles no fewer than seventeen bridges had to be built, in length from 10 to 50 feet, and to get trail at all it was necessary to make wide detours from the line.

Although this district is not suitable for general agriculture, it holds out good possibilities for stock-raising. There are some meadows, like the one on the old Robinson Creek Trail, of considerable extent, which could be cut for winter-feeding. This applies also to quite an extent of land in the vicinity of Horseshoe Lake, on the Manson Creek Trail. While the soil is, in general, a light sandy loam, it was particularly noticed that where fire had burned over spruce bottoms a very heavy growth of red-top grass resulted. Horses which got to the work in very poor condition rapidly fattened on this grass.

THE NATION RIVER.

The valley of the Nation River is very narrow where crossed, though it widens out to the west in the vicinity of the Nation Lakes. This land is surveyed and the surveys were tied to our line. Travel along the banks of the river is exceptionally difficult on account of windfall. There has been considerable good timber in this valley at one time, but fire has destroyed a good deal of it. Several good meadows were seen, though not of large extent. The river is about 350 feet wide, and at high water delivers a large volume of water, as the current is rapid. It is navigable from the Nation Lakes as far as a canyon about 15 miles from its confluence with the Parsnip River. The delivery varies a great deal, as it was found easily fordable for horses with packs about September 25th, where, on July 1st, horses were forced to swim when crossing.

BETWEEN NATION RIVER AND MANSON CREEK.

The land rises rapidly about 500 feet soon after crossing the Nation River, and for 9 miles is of a similar nature to that south of the river. There is a large number of small lakes abounding in rainbow trout. Twenty-six miles north of the 55th parallel the line enters a high, broken range of mountains forming the divide between the Manson Creek and Nation River drainages and extending to the Parsnip River on the east. Many of the bare, rocky peaks attain elevations considerably over 6,000 feet. Very little timber is found above 4,500 feet. On the summit of the lower hills in many places are seen large open spaces covered with moss or light grass and studded with a great variety of flowers. At no place in British Columbia have I seen so splendid an opportunity for the student of botany or ornithology. Indians report the range as splendid hunting-ground for caribou. A great many tracks were seen on the soft moss on the open glades.

Considerable quartz was seen on this range, and nearly all the rivers carried quartz, some of which is gold-bearing. Nearly all the creeks showed evidence of prospecting. About fifty years ago, at the time of the gold-rush to Manson Creek, it is reported that there were 4,000 men in that district, and that nearly the whole country was prospected. There are still a few prospectors in there who are enthusiastic over the possibilities of the country from a mining standpoint. One company is still operating on Manson Creek and is reported to have had a profitable season. It is probable that, with improved facilities for transportation of heavy machinery into this district, a great impetus would be given to gold-mining. Further evidence is found in this district of extensive prospecting at one time in the old trails, which, with widening and clearing, were used in some instances.

There is quite an area of timber in this range of mountains, spruce, balsam, and jack-pine predominating. Some of it could not readily be worked, but a great deal of it is easily accessible to Manson Creek.

FROM MANSON CREEK TO FOOT OF ROCKY MOUNTAINS.

The line crosses Manson Creek about 45 miles north of the 55th parallel. Soon after crossing the river there is a sharp ascent of 1,300 feet. This forms the south-eastern end of the Wolverine Range. The foot of this range on the north side comes about Mile 53. From this point to the foot of the Rocky Mountains, 3 miles north of the Finlay River, the land is, in general, level or gently undulating. The 56th parallel of latitude was crossed 3 miles south of the Finlay River, and the line extended 6 miles beyond this point to the base of a spur of the Rocky Mountains, lying south of the Ospica River. Mile-posts were numbered consecutively from the 55th parallel for 75 miles, and the monument marking the 56th parallel placed as an intermediate post in Mile 70. This arrangement was to prevent a narrow strip of about 15 chains appearing in subsequent adjoining lot or section surveys.

LAND IN THE VICINITY OF THE FINLAY AND PARSNIP JUNCTION.

The junction of these two rivers lies very close to the 56th parallel and about 7 miles east of the 124th meridian. The valleys lie in a general direction about 30° west of north, the Finlay River flowing south-easterly and the Parsnip River north-westerly. After their junction to form the Peace River they flow through the Peace River Pass of the Rocky Mountains in a generally easterly direction. The northern limit of this drainage is about the 58th parallel and the southern limit about 20 miles north of the 54th parallel. The Rocky Mountains forms the eastern boundary, and a height of land, including the Cassiar and Omineca Mountains forms the western boundary. This height of land runs from about the 123rd meridian at the south to the 127th meridian at the north in an irregular line.

The area within these boundaries is about 23,000 square miles and includes several economically important tributary drainages. The Nation River, flowing into the Parsnip, drains a large area of surveyed agricultural land in the vicinity of Nation Lakes. Manson Creek, flowing into the Finlay River about a mile west of the junction of the Finlay and Parsnip Rivers, has been at its headwaters a centre of considerable activity in placer-mining for over fifty years. The Omineca River and its tributaries drain a large area of agricultural land, and also offer inducement to prospectors for gold and argentiferous galena. The Ingenika River has not been so carefully explored as yet.

Near their junction the Finlay River is somewhat larger than the Parsnip River, running in width from 600 to 1,000 feet. Both are easily navigable rivers, and during the stages of high water will accommodate large river-boats. At all stages of water they are good rivers for small boats, affording splendid facilities for the surveyor, explorer, trapper, and others doing the pioneer work necessary to arrive at a true knowledge of the country. On account of the almost entire absence of rock along the banks, the thread of the stream shifts from year to year, forming numerous islands, sloughs, and sand-bars. In places cut-banks, up to 150 feet in height, occur along the rivers.

In the vicinity of the junction the valley extends from the foot of the Rocky Mountains on the east to the foot of the Wolverine Mountains on the west, a distance of about 20 miles. From the mouth of the Omineca on the north the valley maintains this width for about 15 miles up the Parsnip River, when it rapidly narrows to a width of from 2 to 5 miles. All of this may not be considered agricultural land for immediate settlement. It does, however, represent closely the area which might eventually be brought under cultivation on the improvement of transportation facilities and the building of roads to give access to the waterways. Reports from different sources agree that there is agricultural land along the Finlay River for a distance of 100 miles above the Omineca River, and that the valley averages about 6 miles in width. A more detailed survey will probably show in the two valleys an area suitable for agriculture of between 500,000 and 600,000 acres, the greater portion of which is within 5 miles of either river. Settlement will be continuous, as there is probably no place in about 140 miles of waterway where settlement on one side of the river is not practicable.

NATURE OF SOIL VARIES.

The nature of the soil over the area varies considerably, though practically the whole extent has one feature in common—namely, the entire absence of rock in place or large boulders. This fact renders the cultivation of the land, when cleared of timber and brush, very easy. On the western side, in the area most directly affected by the detritus from the Wolverine Range, the soil is found to contain a large percentage of fine mica sand. It was noticed that when fire had run in this district the soil was pretty well burned and rendered almost barren. In the near vicinity of the rivers there is a much greater depth of sandy loam or black loam and humus. In a great many places where fire had run, the soil, though burned considerably, was not stripped, evidence of which was found in the abundant growth of grass, peavine, and vetch.

CONSIDERABLE VALUABLE TIMBER.

On the northern slope of the range of hills lying between Manson Creek and the Parsnip River there is considerable valuable timber, principally spruce, balsam, and pine. A great deal of this runs as large as 30 inches in diameter and is of good quality and height. It is easily logged to Manson Creek, which has sufficient water for a few months at high water to float timber to the junction. Besides the timber suitable for sawing purposes, there is a great deal

of timber of a size suitable for ties and poles. There is also quite an extent of land west of Manson Creek and south of the Finlay and Omineca Rivers which would classify as timber lands. This timber is not so large or of as good quality as the hill timber, but is easily accessible to the rivers, as the country lends itself to road-building. Poplar, birch, and cottonwood are found scattered throughout this area, principally in the river-bottoms.

Generally speaking, there is not much open meadow throughout this district. Reports from different sources agree that there is a greater percentage of open meadow farther up the Finlay, affording splendid opportunities for stock-raising. The pre-emptor can readily find a location where a fair percentage of his land is easily cleared and quickly made to produce. Potatoes and other vegetables of good quality were seen growing at the junction. Oats were also ripened without injury by frost. I didn't reach the valley till the season was well advanced. We had some frost when camped on the Finlay River from September 12th to 17th, but reports from settlers in the district agreed that there had not been sufficient frost during the earlier months of the summer to do fruit or vegetables any harm. This was borne out by personal observation, as considerable wild fruit of good quality and well ripened was picked. The varieties found were cranberries, gooseberries, red and black currants, blueberries, and raspberries.

PRECIPITATION.

While in the mountains south of Manson Creek during part of July and August a great deal of rain fell. It was thought at the time that it was local and due to the mountains, but it was later learned that the rainfall had been general over the whole valley. During the latter part of August and the early part of September there was no rain. Settlers in the vicinity report that during the winter snow lies in the valley to the depth of about 18 inches. On April 15th of this year all this had disappeared in the valley, and climatic conditions of this year may be considered fairly representative of what may be expected from year to year.

EXTRACT FROM THE REPORT OF A. H. HOLLAND.

DATED NOVEMBER 25TH, 1914.

[Mr. Holland was employed in 1914 by the British Columbia Government in making surveys between Quesnel and Prince George.]

All this country has at one time been heavily wooded with fir and spruce, but the big fires of thirty or more years ago practically swept the country bare, and the only evidence of the original stand of timber is to be seen in the few remaining rotten stumps and roots and wind-falls. The present growth is poplar and willow, with jack-pine and small spruce on the ridges, and is easily cleared.

Our first work was the laying-out of the sections and fractional portions lying between the railway and the river, which, though broken by the hillside, have benches of good soil and are likely to be cultivated at an early date.

Parallel to the Fraser River and about a mile distant is a rolling bench, with a more or less gravelly soil, which drains both westerly to the Fraser and south-easterly to Hixon and Canyon Creeks, and it was on the easterly slope of this bench that what I consider the best area for pre-emption was found. The soil is a silt or clay, with a little gravel on the higher ridges, well watered, and the clearing is light.

There has been no settlement of this land prior to my surveys, but before the end of the season I had made out pre-emption application papers for twelve intending settlers, and, besides these, no doubt there were others which would come from settlers themselves, of whom there were numbers cruising the land seeking the best locations. Many of these men were preparing to put up cabins, and already had purchased food-supplies to carry them over a period of ten months.

The eastern boundary of this block of land extends across the gulch of Government Creek and up Hixon Creek, on both of which streams there was considerable mining excitement this season, and the former is practically all staked with placer and hydraulic claims; while on the latter some quartz ledges have been recorded and a hydraulic company was preparing to work.

Hixon Creek was the scene of mining development about thirty years ago, when the Quesnel Quartz Company operated a 5-stamp mill on some claims there, but these were abandoned owing to the high cost of operating, and until two years ago had probably not been visited by any other

than trappers and hunters, so that the old buildings, though standing, are in a poor state of repair.

Two years ago gold in paying quantities was discovered in the bench land above the old plant, and a company was formed, which has done considerable prospecting, besides completing a wagon-trail to the property from the site of a future siding on the Pacific Great Eastern Railway, which is only about 4 miles away, and in the near future there will probably be considerable work done.

As we worked north from this block we gradually passed out of the burnt area, through the windfall and standing burned timber, where there is more or less gravel, to the growth of small pine and spruce, throughout which the soil is generally good, being a silt or clay, and the clearing is heavier. The proximity of the railway had already brought an influx of settlers, and we found cabins and in some places small clearings and gardens on 50 per cent. of the sections surveyed. This condition exists throughout the balance of my surveys, as there was a decided move "back to the land," and considerable time was spent in giving information to intending settlers, as to trails, etc., to enable them to make selections.

The trails built this year by the survey parties and those built by the railway contractors from the river to the grade have made all this country easily accessible by pack-horse, and in the vicinity of Fort George Canyon, where a block of 10,000 acres was laid out and where the growth of spruce and pine gives way to poplar and willow, several settlers have been able to plough patches of from 2 to 5 acres this autumn, besides building comfortable log cabins for the winter.

Northerly and easterly from Fort George Canyon our work left the railway and skirted the boundaries of the alienated land, and again entered the standing green timber, but everywhere we saw cabins building or built, and from Buckhorn Lake to the end of our work, where the settlers had been on the ground for more than one season, we were able to buy vegetables whenever required.

The country is specially adapted to mixed farming, vegetables of all kinds growing readily and maturing successfully in the ten weeks extending from June 15th to the last of August, during which season there is freedom from frost, which occurs in the early part of June and the last of August. There is abundant rainfall, and this, combined with the long, hot days on which the thermometer rises to 80° in the shade, matures any crop very quickly.

Wherever there is any open land or where the country has been fire-swept, there is a luxuriant growth of vetches and wild grasses, and on the southern area surveyed there is lots of summer feed for a few stock.

The cost of clearing in this country varies with the locality, and the only approximation of it obtainable is by taking the figures of the railway contractors for the right-of-way near here: in the poplar, willow, and small jack-pine they paid per acre from \$15 to \$40 for clearing and burning, and where necessary an additional \$10 to \$25 for stumping, and in the pine and spruce from \$30 to \$50 for clearing and burning, with the addition of from \$50 to \$70 for stumping. These prices should be the maximum, as the work is carried on continuously, regardless of weather conditions; while in the case of a settler the work would be done when the weather was most suitable.

This section, lying as it does along the foot-hills of the Cariboo Range, abounds in game, and numerous signs of moose, caribou, mule-deer, and black bear, and occasionally the animals themselves were seen everywhere, as also small game such as grouse, spruce-partridge, and rabbits, which are also very plentiful.

EXTRACTS FROM THE REPORT OF C. W. MURRAY.

DATED DECEMBER 3RD, 1914.

[Mr. Murray was employed in 1914 by the British Columbia Government in making surveys in the vicinities of Beedy Creek and Horsefly River.]

This locality is locally known as Peavine Ridge or Beedy Creek Valley; the former from the luxuriant growth of wild peavine among the scattered small poplars, and the latter from the fact that Beedy Creek, an 8-foot stream, originates here from the many springs and beaver-dams. This stream wends its way northward to Beaver River, and thence to Beavermouth, located on Quesnel River.

Following our tie-line down Beedy Creek, the valley gradually becomes narrower and deeper until for the last 8 miles it is a mere canyon, the stream being augmented by several small ones, and one of an equal volume draining the large, lightly timbered plateau which reaches nearly to the Fraser River on the west.

The soil in the valley is of the best, being for most part silt and decayed vegetation, formed in ancient beaver-dams, and as the elevation, about 2,500 feet, is not excessive, good crops of hay, oats, barley, and the hardier vegetables should be grown successfully. In fact, the only settler in the vicinity has, with no effort, made a success of raising these products of as good quality as those grown at the Coast, while his cattle have roamed the hills and valleys, multiplying and fattening to the benefit of his bank account. Small fruits, such as strawberries, currants, and gooseberries, grow wild, and therefore should give good returns when cultivated. Larger fruit-raising has not been tried, though several of the men who located during the season are determined to give it a fair trial, as well as to farm the ground for results. There should be good reports from this district in the near future.

The benches on either side of the valley proper are nearly flat, that to the east being heavily timbered with large fir, getting more rocky until at a mile back there is a ridge of solid limestone overlying an iron-bound conglomerate that extends westward to Beaver Valley. As there has been a recent fire over this rocky territory, it will be of no practical use for years to come. The bench to the west, lightly timbered with poplar, spruce, and fir, has a more or less gravelly soil, many large areas of which are covered with rich loam. At a distance of about a mile this bench dips to another small and fertile valley, in which are a couple of good-sized lakes and numerous beaver-dams drained by Fredy Creek, which flows into Beedy Creek.

To clear most of this land would cost from \$25 to \$75 an acre, and once cleared should grow good crops, as evidenced by the luxuriant growth during the past season of wild grasses, peavine, brilliant-hued wild flowers, and luscious wild berries. There are a few open meadows and marshes that could be drained at small expense, when they would grow abundant wild hay of excellent quality.

Timothy and clover seem to grow well wherever the seed is scattered on soil, as seen along the roads and openings in the timbered areas. Alfalfa-growing has not been attempted, but should do well in some of the bottom land.

The rainfall during the season was light, but of sufficient quantity and distribution as to keep the crops growing, allowing ample time to cure the heaviest crop of hay the ranchers have had for several years and harvest a large field of oats.

During June there were a few very hot days, followed by thunder-showers and a couple of white frosts, which did no damage beyond nipping a few potato-vines. July, August, and September were beautiful growing months. Fall frosts started about October, and until the end of the month, when we ceased operations, we had fine weather and no snow.

Settlers informed me that last winter there was little cold and no snow until the new year, the thermometer rarely registering -40° , and that for only a short period. The snow sometimes attains a depth of 3 feet, but a Chinook wind is liable at any time to melt it off in a night, and it is always off by the last of April, when ploughing is started, seed being sown during May and June and harvested in October.

Most of the produce of the past few years has been used by the freight teams and construction parties of the Grand Trunk Pacific and Pacific Great Eastern Railways, the latter being about 12 miles from Beedy Creek Valley, reached over a good road. At Beaver Lake, 6 miles to the east, over a comparatively good road, there is a small store, sawmill, and post-office which, as it is on the stage line from the 150-Mile House to Quesnel Forks, receives the mail weekly.

HARPERS CAMP.

Our next move was up Beaver Valley 12 miles over a good road to Horsefly River Valley, in the vicinity of Harpers Camp. From Beaver mouth to our limit up Horsefly River is 60-odd miles, so there are some differences as to soil and climate. This district is drier than either Beedy Creek or Beaver Valley, though not enough to affect the growth. The general lay of the land is level, is of an old glacial and river formation through which at present meanders the Horsefly River, having its origin among the snow-capped peaks about 80 miles to the eastward, and emptying into the west end of Quesnel Lake, which lies about 12 miles to the north of Harpers Camp.

The soil of what was the old river-bottoms and along the banks of the present river is of a sandy, silty nature, and grows large crops when properly tilled, but in these places, owing to the fertility, there is a dense growth of willow, poplar, and in some cases spruce, which of necessity makes the clearing difficult and expensive.

Most of the district having been burnt over in the early prospecting days has grown up with scattered small poplar, willow, and black pine, which can be cleared off at from \$20 to \$60 per acre. In many places, away from the river, stones appear as "freestones" lying on the surface, and by once picking them off splendid soil remains, ranging from light to dark chocolate loam, which I should judge could be worked by either dry-farming methods or by irrigation, and if worked intelligently along either of these lines would bring good results. During May and June, as there were several showers, the crops did well, vegetables doing exceptionally so where attended.

Should irrigation be needed, and I am told that it can be used to advantage, this district lends itself particularly to the scheme. There is abundance of excellent water to be had everywhere. If one cannot procure a living spring or a clear, live, cool stream, he can dig a well and not have far to go to strike good water.

The summer climate is almost ideal, with long growing days and bright sunshine, and while mild frosts may be looked for from September to June, quite cold weather may be expected for short periods in the winter, there being sufficient snow for good sleighing.

The settler need never want for meat or fish as long as he has a gun or fishing-tackle, for the streams and lakes abound in various species of trout, the lowlands are plentiful in grouse, prairie-chicken, and rabbits, while the shores of Horsefly and Quesnel Lakes offer all a big-game sportsman could wish for in the shape of black, cinnamon, and grizzly bears, moose, caribou, and deer.

The district offers so many opportunities that the most fastidious should have no trouble in locating on ground that would, with intelligent application, make himself and generations to follow a good remunerative home.

EXTRACTS FROM THE REPORT OF R. P. BISHOP.

DATED DECEMBER 4TH, 1914.

[Mr. Bishop was employed in 1914 by the British Columbia Government in making surveys near the Fraser River, north of Quesnel.]

GENERAL PHYSICAL FEATURES.

At White's Landing the Fraser River leaves its general southerly direction and makes an abrupt turn to the west of some 10 miles to the mouth of the Blackwater, recovering its easting by the mouth of the Cottonwood some 18 miles to the south. As far as can be gathered from a somewhat rapid trip across it by trail, the greater portion of the peninsula thus formed would appear to carry a very considerable quantity of timber, which will be described in detail later. The surface is somewhat high and broken and apparently not suitable for agricultural purposes, with the exception of the flats on the banks of the Fraser. To the east of this district is a depression drained by the White's Landing and the Canyon Creeks to the north and a fork of the Cottonwood River to the south. There is a great deal of very good land here which has already been surveyed. The Pacific Great Eastern Railway lies along the eastern edge of these old surveys, leaving the Fraser by the valley of Hixon Creek, up the tributary Canyon Creek and its branch, Meadow Creek, to the headwaters of the latter, then over a low divide to the Graveyard Creek, which it follows as far as the main fork, leaving the old surveys a little to the west at this point. East of the northerly part of this block are the southern foothills of the Cariboo Range, which eventually resolve themselves into a high gravelly plateau capped by a few isolated hills and covered with pine or windfall. The greater part of the work this year lay between the older surveys and the high land to the east; also filling in the gaps between the blocks on either side of the Cottonwood as far west as the Fraser. Also a little work was done at White's Landing and near the mouth of the Blackwater. The soil varies in coarseness from clay and silt to sand and gravel, having nearly all been deposited by water

or ice. It is therefore easily eroded by the creeks and rivers, which have in consequence a tendency to cut for themselves channels below the general level of the country. This tendency is especially noticeable in the neighbourhood of the larger bodies of water, or where there is a rapid fall, and accounts for the extremely broken nature of the country and the lack of surface water in places. On the other hand, when one gets away from the larger watercourses and up on the level stretches, the surface water runs off in small brooks more or less on the general level of the land, instead of in larger streams forming deep gulches; in other words, such land is well watered.

MINERALS.

There are a shaft and engine-house and some very extensive old placer-workings on Hixon Creek a few miles above the railway crossing, but as they are north of the district referred to in this report I will not describe them in detail. Most of the streams coming in from the east carry colours in gold. In the spring a certain number of prospectors were panning on Terry Creek and the neighbouring streams, but they did not appear to have considered it worth while to build sluice-boxes or bring in many supplies. In September there were four or five panning on Graveyard Creek, where they were getting colours in flake-gold. On the main branch of the Cottonwood, above and below the Canyon Creek railway crossing, some seven or eight parties were using sluice-boxes and seemed to be making fair wages. The gold was coarser than that taken from Graveyard Creek. Some of these said that they intended to stay in through the winter and get things ready for serious work in the spring. On the south bank of the Cottonwood are the remains of a large flume some 6 or 7 miles long, extending down-stream from the railway crossing, which was used for hydraulic work near the mouth of the Cottonwood, but has long been abandoned. The rivers seem to have been worked extensively in the old days, but will probably pay for reworking as soon as the railway is in running-order and supplies are reasonably cheap. Don Killom has a placer proposition on the north bank of the Fraser by the Cottonwood Canyon which has been working for some years.

Close to the railway crossing some quartz-outcrops said to contain values in copper have been staked. Outcrops of graphitic shale appear in the cut-banks to the north of the Cottonwood River here.

GENERAL CHARACTER OF THE COUNTRY.

For the first 5 or 6 miles to the south of the Hixon Creek the eastern boundary of the old surveys follows very closely the course of Canyon Creek. This is readily fordable everywhere except at high water, when the regular crossings have to be used. The valley of the creek is about half a mile wide, and the northern part is from 100 to 200 feet below the general level of the country; the creek pursuing a tortuous course down the valley, rebounding from one cut-bank to another on either side. Farther south the valley is not so deep. The country east of the river has been almost entirely burnt over, and several quarter-sections in the neighbourhood of Terry Creek have been burnt completely clear. Some of these being of good silt soil should prove easy to cultivate. As, however, all the humus has been burnt off and the soil baked by the fire, it would probably have to be ploughed and exposed to a winter's frost, and then be sown with clover, and that again to be ploughed into it.

At Lot 3193 the main body of Canyon Creek enters from the east, and the railway continues in a south-easterly direction up a tributary called Meadow Creek from the swampy nature of the bottom through which it passes. This creek averages half a mile wide and was difficult to cross in places owing to being flooded by numerous beaver-dams. A good many of these had been blown out during railway-construction. Some parts were muskeg, but others to the south-east of Lot 4407 will prove very fertile when drained, as the swamp keeps to the same level for several miles. This drainage will, however, be a costly process, involving some thousands of dollars and quite beyond the power of any single pre-emptor to handle.

Some 2 miles south of the summit the right-of-way approaches the North Fork of the Cottonwood (now known as Graveyard Creek), which rises in Ahbau Lake, some 14 miles due east. There are some promising-looking quarter-sections here on good soil. The railway has a section reserved and three or four pre-emptions have already been taken up. East of this point the valley of Graveyard Creek is covered with an extraordinarily dense underbrush, which made a journey of a few miles up it a matter of much labour. Several quarter-sections of good land in the bottom covered with a heavy growth of timber were left unsurveyed, as much time would have been wasted in moving a camp to them.

At this point the area surveyed was extended to the west as far as the old survey on the Hixon Creek Trail, as it was considered more useful and eventually more economical to make one survey of this tract of country, although the land taken in was not all of value. The railway follows the west side of Graveyard Creek south for about a mile and crosses it where it enters a canyon about 150 feet deep. The river then flows at a general level of 200 feet below the rest of the country until it meets the main branch of the Cottonwood. The land is very broken near the valley, but there is some good land near Graveyard Creek, and also south of Alder Gulch, the latter being very easily cleared. The railway cuts some 60 feet deep through the ridge, joining the two forks of the Cottonwood, turns up the valley of the main river for about 2 miles, as far as the canyon, where it crosses the river at a height of some 300 feet above water-level. The bridge to be erected here will, I believe, be the highest in British Columbia. The right-of-way then makes some serpentine curves to reach the summit to the south, which it attains by a remarkably good grade considering the nature of the climb. Once on top of the flat, the land is good sandy loam covered with heavy windfall.

A large flat in the river-bottom west of the crossing has been taken up by the railway company for townsite purposes, and seems to be well adapted for this, being level, clear, and well drained.

After completion of the work as far as the main block to the south of the Cottonwood, a tier of sections was surveyed along the river as far as its junction with the Fraser. There are about six flats between the river and the cut-banks bounding the valley, some of which are clear; others carry heavy cottonwood and spruce. Some pre-emptors are already located here.

THE PENINSULA EAST OF THE MOUTH OF THE BLACKWATER.

The soil seems to be, generally speaking, very good, being clay loam, or silt with gravelly ridges, and this district has the very great advantage of being away from the larger waterways, and consequently not cut up into deep gulches.

A mile or so west of the surveys the trail continues until within about a mile of Lot 897 through green timber consisting of fir, spruce, and balsam, running to a very considerable size. In the spring I observed very good timber about 2 miles to the south-west of White's Landing, and I have reason to believe that the belt we crossed on the trail extends north to connect with this and south to the neighbourhood of the Cottonwood Canyon. It would therefore appear that a very considerable amount of timber exists in the unsurveyed land of the peninsula formed by the Fraser River east of the mouth of the Blackwater, especially as heavy fir is reported to the south of Lot 4886.

Three pre-emptions were surveyed adjoining Indian Reserve No. 1, at the mouth of the Blackwater. Like most along the river, they consist of silt-flats along the water's edge, generally bearing heavy cottonwood, and about a quarter of a mile back rising some 400 or 500 feet in a series of steep banks well covered with fir. The plateau on top has good soil, but is very dry, as all water drains off to the river. The Indian reserve has several graves belonging to the Blackwater Tribe, who are said to have died years ago during one of the great smallpox epidemics. A trail running west to the Blackwater Telegraph-station has recently been cleared out by the Forestry Department. It rises about 500 feet in the first half-mile, and then falls rapidly to the Blackwater at the junction of Tako Creek. The Blackwater flows through this hill by a very narrow canyon some 300 feet deep and impassable for a road. Above this point the valley widens out considerably, and would become a lake if a dam were built across the river, a matter apparently quite feasible in the narrowest part of the canyon. A large electric-power plant might develop here, as the reservoir thus formed would probably contain enough water to supply power through the winter, when most of the water-power in the country is frozen up.

AGRICULTURAL DEVELOPMENT.

Although several pre-emptions have been taken up in the district, the only farm in good working-order away from the banks of the Fraser is on the Duke of Sutherland's property in Lot 3181, locally known as "The Prairie." Mr. McKay, his agent here, is highly delighted with the place, a great portion of which is open prairie. The soil is clay or fine silt covered with 4 or 5 inches of mould. The growth of crops here is very rapid; on June 25th turnips sown on the 18th or 19th were well above ground, and Mr. McKay said that last year, under exceptionally favour-

able conditions, some had actually appeared in three days. Beets planted on June 12th were 1½ inches high on the 25th, and cabbages were doing very well. Oats sown on May 12th were 6 inches high, and others sown on the 27th were well above ground; all had appeared within ten days. Last year wheat and rye were tried with success, some of the latter being 6 feet high.

The agricultural development of any part of the Northern Interior is so dependent on conditions governing the whole district that a review of the general situation may be in order. I refer to the areas opened up by railway-construction north of Quesnel and west of Fort George. Several sections of this district vary in minor respects, but may, generally speaking, be classed as a whole in regard to climate, soil, and, approximately, elevation and latitude.

This immediately opens up the wide subject of speculation as to what particular varieties of crops and stock can most advantageously be produced, and also as to the best means of cultivating or of rearing them. But if left to the initiative and judgment of the individual settler the solution of these problems would require many experiments, wasting time, money, and energy, involving disappointment and discouragement, and consequently retarding development. Only trained or experienced farmers who know the country well could without guidance bring such experiments to a successful issue at minimum cost.

The key to the problem would seem to lie in the establishment in the district of a fully equipped experimental farm, where tests of every description as regards stock and crops might be made under the conditions peculiar to this part of the Province, and whence expert advice and assistance might be obtained by the settler from the very first. The Government Farm at the Cariboo Road would not supply the particular need of the district, the climatic conditions being essentially different. The great advantages which have already accrued to other parts of the Province under this system show the practical value to the country and encouragement to settlers which further development of it would undoubtedly bring. For most of the country requires clearing, and the average settler with limited capital would hesitate to attempt this while uncertain as to the best use he could make of his land and its possibilities of production.

In this part of the world—as elsewhere—scepticism is not unknown, and the most convincing reply to it lies in successful demonstration. Take, for instance, the case of Quesnel. After an absence of three years the feature that impressed one there was the extraordinary increase in the development of the gardens, where varieties of flowers and vegetables were flourishing which a few years ago no one would have attempted to grow in this climate. Masses of bloom and grassy lawns reminded one of cottage gardens in Devonshire, and were most encouraging evidences of the value of faith and experiment in all branches of cultivation.

The idea of an experimental farm is indeed capable of extension along various lines, and notably as regards experimenting with the hardier kinds of grass for range, where the land proves unsuitable for other purposes; the diminution of range in the west and the consequently increasing price of meat making it desirable to utilize for this purpose otherwise unproductive land. The luxuriance and variety of the flora on some of the quite gravelly soil suggests the idea that some such use might later be found for it.

GAME.

Several moose were shot by settlers and prospectors during the year, and we constantly saw tracks while working on line. Deer were seen in great numbers, several at a time on successive days. As to bear, I believe there are no grizzly in the immediate neighbourhood, but black are very numerous: within eight days we saw five at very close range: the first climbed a tree beside the trail, and shortly after two half-grown ones came within 30 feet of the transit, which seemed to afford them extreme interest. They evidently reported to headquarters the invasion of their territory, for soon afterwards two full-grown ones appeared on the scene on line: I did not see these, but gathered from accounts that they were of prodigious size, and after this the party went out armed, with the result that no more bears were seen. Apropos of bears, an interesting yarn was told by the engineer who was locating a road here a few years ago. The picketman, after setting a hub, was observed to turn head over heels and take to the woods, and investigation revealed the fact that he had begun operations on top of a bear's den, both parties concerned appearing equally disconcerted. In regard to small game, grouse were more than plentiful in places. The country has been well trapped, but there are a good many beaver left on Canyon Creek where they have cut some very large trees.

EXTRACT FROM THE REPORT OF H. H. ROBERTS.

DATED DECEMBER 9TH, 1914.

[Mr. Roberts was employed in 1914 by the British Columbia Government in making surveys in the southern portion of Cariboo District.]

TOWNSHIP 39.

The first work of the season consisted in subdividing Township 39. This township lies immediately north of the 52nd parallel, which is the boundary between the Lillooet and Cariboo Districts. Access to this township is by a wagon-road leading from the Cariboo Road at 141-Mile House, and passing through Townships 43 and 41, which lie west of Township 39, and were subdivided by H. T. Garden, B.C.L.S., in 1913. In its passage through this township the wagon-road follows approximately the course of Knife Creek and joins the Horseshy Road near Half-way House. The junction of these two roads is about 3 miles east of Township 39. Near the north-west corner of Lot 337 this wagon-road is connected with 149-Mile House by a good horse-trail. The distance from 141-Mile House to the intersection of the wagon-road and the west boundary of this township is about 12 miles. The line of the Pacific Great Eastern Railway is about 3 miles west of 141-Mile House.

Township 39 consists largely of gently rolling bench land, broken in places by deep ravines. The general inclination of the surface is towards Knife Creek, which traverses the township in a south-westerly direction. In Sections 14, 15, and 23 this creek enlarges into a lake, known locally as Squawk Lake, about $1\frac{1}{2}$ miles long and containing an area of 220 acres. This lake is well stocked with fish of various kinds.

The bed of Knife Creek is from 10 to 50 feet wide and its depth averages 1 foot. Its water, though fresh, is slightly alkaline and rather insipid to the taste. From the east boundary of the township to the centre of Section 15 this creek flows through fairly level country; the remainder of its journey through the township is along the bottom of a deep and wide ravine. Eventually Knife Creek empties into San Jose River.

A small creek having its source in willow and spruce swamps in Section 21 flows in a westerly direction, and in the next township becomes tributary to Knife Creek.

Two lakes, having areas of 40 and 48 acres, were found in Sections 34 and 35. The best water for drinking purposes is found in spruce-swamps, of which there are many in the township.

There are numerous meadows and swamps which, if drained, will produce good crops of hay; some of them, at present, though without drainage, are covered with a fair growth of wild hay. To ensure good drainage war must be declared on the beavers. Beavers, when they find a creek not sufficiently deep for their purpose, throw across it a dam constructed with great ingenuity of wood, stones, and mud, gnawing down small trees for the purpose, and compacting the mud by blows of their powerful tails. Any level land above the dam will in consequence be flooded.

Excepting meadows and willow-swamps, Township 39 is covered with timber ample to provide settlers with material for building, fencing, and fuel. Jack-pine is in the preponderance, interspersed with fir, poplar, and spruce. A few quarter-sections are rather heavily timbered with fir; but, as the latter is inferior in quality, the lands are not classed as timber lands. The township shows evidence of a severe fire, numerous tracts of timber having been completely burned off.

The soil generally is a sandy loam. The best land is in the south-west quarter, where in some parts the soil is good black loam. The north-east portion contains many large boulders. In this quarter of the township, and also in some quarter-sections in the south-east quarter, the soil was found to be rather stony. In common with many other parts of the Cariboo District, the quality of the soil varies with the timber. Jack-pine usually indicates the presence of sandy loam, more or less stony, and the absence of moisture. In fir lands the soil is sometimes a sandy loam, but generally a richer loam and chocolate-coloured, though lacking in moisture. Good loam in a moist state is associated with poplar and cottonwood. Spruce timber thrives best in a gravelly soil, which is usually overlaid with muskeg.

Township 39 is well suited for the raising of stock. In the opinion of old-timers in the district, the high elevation of the township (averaging 3,500 feet), its unsuitability for irrigation, and occasional summer frosts would preclude the successful ripening of grain. Quick-maturing vegetables and green food for stock can be grown in abundance. The prosperous appearance of

Sunnyside Farm, owned by Hill & Paul, and situate near the east boundary of adjoining Township 41, which is similar in characteristics to Township 39, gives undoubted evidence of the great measure of success that rewards a settler who turns his attention to the raising of stock, dairying, and poultry-keeping. The vegetable-garden was seen filled with the more usual vegetables, such as rhubarb, carrots, turnips, beets, cabbage, and cucumbers, all ripening and doing well.

With the exception of Lot 337 near the westerly edge of Squaw Lake, the whole of Township 39 is open for pre-emption.

VICINITY OF WILLIAMS LAKE AND 150-MILE HOUSE.

The whole of the area surveyed by me in this locality is practically within reach of one or other of the several good wagon-roads which leave the Cariboo Road in the vicinity of 150-Mile House. A road leading in a westerly direction from a point on Cariboo Road about half a mile north of 150-Mile House, and following the north shore of Williams Lake, gives access to the southern portion of tract surveyed. Near the westerly end of Williams Lake this road has two branches, one leading to the Chilcotin country and the other to Soda Creek. The latter traverses the western section of the survey.

The Cariboo Road, with its branches to Quesnel Forks and Horsefly country, gives access to the easterly portion of area surveyed, while the Soda Creek and Cariboo Road are joined by a wagon-road which runs in an east-and-west direction through approximately the centre of this area.

This tract of land rises precipitously from the shores of Williams Lake and merges into a fairly level plateau. The elevation of Williams Lake is 1,850 feet and the average elevation of plateau is 2,400 feet.

With the exception of the pre-emptions on the south shore of Williams Lake and those on the Chilcotin Road, the surveyed area extends about 6 miles north of the lake and is about 14 miles long.

In this area there are about fifty pieces of land held under pre-emption record. Most of the settlers have built good houses and have some land cleared.

Settlers have been attracted to this district by the proximity of the Pacific Great Eastern Railway, which at the present time is being constructed along the south shore of Williams Lake and the north bank of Williams Lake Creek.

Although this locality had for many years been served by good roads, settlement for agricultural purposes was retarded by lack of railway communication and easy markets, without which the life of a farmer presents many obstacles to success and little incentive to progress.

Throughout the Central Interior the settler, as a rule, has engaged in cattle-raising as the easiest means of utilizing his land. There has always been a good market on the Coast for beef, and cattle can be driven long distances to points of shipment. A cattle-rancher's life has its attractions and is not arduous.

The land in the Williams Lake District is well adapted for cattle-raising. To the man with sufficient capital to start in with a small herd, and who can afford to live on his land without the necessity of looking around for outside work, this locality offers many suitable places where a good ranch can be built up. The present high prices of beef, averaging \$75 per head for 3-year-old steers, must leave a good margin of profit for the producer; and the wider markets which will be available on the completion of the Pacific Great Eastern Railway should make the side-lines of dairying and poultry-farming very profitable.

The country at present affords good grazing for a fair number of cattle; and, once cleared and cultivated, green crops can be grown in abundance.

The land in this district is not well adapted for agriculture by the ordinary methods. While the farmer using intelligence in selecting his sites can undoubtedly raise the hardier varieties of small grains and vegetables, the small amount of precipitation makes the ordinary method of agriculture rather hazardous if pursued as a sole means of livelihood. Information as to the rainfall, extending over a sufficient number of years to be reliable, cannot be obtained. The average rainfall in this district is generally assumed to be 12 inches. From the table accompanying the report it will be observed that the number of days on which rain fell would hardly provide sufficient moisture to ensure successful crops. Occasional summer frosts have also to be contended with; but it is thought that their effects will be removed by increased cultivation of the surrounding country, with its consequent changes in air-currents.

It is probable that dry-farming methods of agriculture will do away with the problem of moisture. Experiments made by the Provincial Experimental Farm at 105-Mile House, and a few enterprising farmers in the Cariboo and Lillooet Districts, tend to show that crops can be grown on land which previously had been considered worthless for agricultural purposes on account of its altitude and unsuitability for irrigation.

The two underlying principles of dry-farming are: First, to keep the surface of the land under cultivation loose and pulverized, in which condition the soil permits the rain and melting snow to percolate readily through to the compact soil beneath; the second is to keep the subsoil finely pulverized and compact, increasing its water-holding capacity and capillary attraction.

Excepting meadow lands, in which the soil is generally a heavy black loam, the soil in this district is usually sandy loam. One great advantage of loam containing a moderate amount of sand is that when cultivated it separates into minute particles, thereby forming into the condition to hold a great amount of moisture, and allowing the rain to quickly percolate down through the soil. This class of soil is also the easiest with which to form a "top mulch" by cultivation, which will prevent evaporation.

TIMBER.

Near Williams Lake the timber is chiefly fir; on the higher lands poplar, birch, spruce, willow, and jack-pine are found. In a few places the timber is good both in quality and quantity; elsewhere the growth is more of an open nature, which, with a little clearing, will afford good land for grazing and agricultural purposes.

CLIMATE.

Month.	Maximum Temperature.	Minimum Temperature.	Average Maximum.	Average Minimum.	Days on which Rain fell.
	Degrees.	Degrees.	Degrees.	Degrees.	
May 13-31.....	---	---	---	---	4
June.....	89	32	70	38	12
July.....	90	39	78	47	5
August.....	88	32	77	38	2
September.....	86	25	68	36	6
October.....	79	25	65	34	2

The climate is healthy and bracing and rivals any to be found in the Central Interior. Warm, dry days and cool nights, with a singular absence of insect pests, have prevailed all summer. In the winter the mercury falls considerably below zero, but very cold spells are of short duration.

GAME.

The construction-work being carried on in the district has apparently driven the deer and bigger game to quieter retreats, but coyotes, beaver, and muskrats are plentiful. Several kinds of grouse and chicken were seen, and the lakes abound with ducks and geese at certain seasons.

EXTRACTS FROM THE REPORT OF R. W. HAGGEN.

DATED OCTOBER 5TH, 1915.

[Mr. Haggen was employed in 1915 by the British Columbia Government in making surveys in the Quesnel River Valley between Beavermouth and Quesnel.]

The flats in the valley of the Quesnel are not wide, the average width being from 30 to 60 chains, but they contain some excellent farming land, the best of which is now held under pre-emption record. The soil in the valley is generally a loam of considerable depth, overlying a gravel subsoil. The climate is excellent, there being a heavier precipitation than in the Fraser Valley, rendering irrigation quite unnecessary, except for ensuring a good crop of hay. I saw good crops of grain and vegetables at different places along the valley.

Gerimi Gravel, the pioneer farmer of the valley, whose ranch is at Gravel Creek, has several hundred sheep, and now cultivates some 50 acres of land on the home ranch, to which he adds new fields each year. He irrigates the hay-fields. Mr. Gravel assures me that the winter climate of the valley is so mild that horses and cattle can rustle on the range all winter; however, the range is very limited, insufficient to permit large herds of stock to be kept.

Originally the valley was wooded with a forest of cedar, but an old fire cleaned it out almost entirely, there being now only scattered patches of a few acres of cedar; old stumps and many windfalls are all that remains of the old forest. In many places the land is almost open, grassy, and capable of being brought under cultivation at a very low cost. In a few places, and especially on some of the hillsides, the brush is as dense as one would find in almost any part of the Province.

The hills on either side of the valley are very steep, broken, and covered with numerous windfalls and brush. A number of small creeks are found along the hillsides, but these sink in the gravel as soon as the flats are reached.

At the Sardine Flats, near Sardine Creek, is found the largest flat, it comprising some 750 acres of land which is fairly level and easy to clear; the value of this flat is mitigated by the poor quality of the soil over the greater portion of it.

In the valley proper seventeen parcels of land were surveyed; of these, six are held under pre-emption record, but the others are suitable for settlement and will undoubtedly be taken up when local conditions warrant an extension of the farming industry.

LAND NEAR SLATE CREEK.

Along and near the new road from Quesnel toward Hydraulic I surveyed six parcels in the pass to the north of Dragon Mountain. These lie near the head of Slate Creek. Five of these parcels are pre-empted already and the sixth contains some good land. The best land is on a bench in the west half of Lot 9130. The soil is excellent, there are several springs, and the clearing would not cost more than \$25 per acre. This land is about 12 miles distant from Quesnel.

13-MILE HOUSE TO COTTONWOOD.

There is no agricultural land along this portion of the Cariboo Road. Hay is cut at 15-Mile Lake. The land is quite high, hilly, and undulating, the vegetation consisting of a growth of jack-pine and spruce. At Cottonwood there is a large ranch owned by the John Boyd Estate. There are patches of good land in the Cottonwood Valley below here and good land on Swift River (the South Fork of the Cottonwood) above Coldspring. At Cottonwood, which is 21 miles from Quesnel, there are store and stopping-house, post and telegraph offices. At the 13-Mile House (Locke's) there is a telephone-office on the Government Telegraph Line.

MINING.

Since the early "sixties" the Quesnel Valley has proved excellent for mining, large quantities of gold being shipped at various times. Chiefly flour-gold is now found. Several dredges have been built at different places along the valley, but have not been a success, though the Hall dredge worked for several years. I have heard that one dredge is still working at 7-Mile Creek, but do not know whether this is the case. However, a number of diggers work along the bars of the river each season and get a considerable quantity of gold. Some white men have told me they can average \$3 per day working with a rocker. In mining of this nature, as with other branches of the industry, luck plays a great rôle. Occasionally a digger strikes a good pocket, taking out a good many days' wages in a few hours. These cases are, however, exceptional.

The flour-gold on these bars is brought to them each season by the freshets, presumably from pockets of gold in banks which cave in. The dirt put through the cradle is taken from a depth of only a few inches from the top of the bar. Considering the small amount of dirt that can be handled through the rocker in the course of a day, I do not consider it any exaggeration to say that the average yield of the ground worked is \$1 per yard. On first thoughts it seems strange that dredges do not make huge profits working these bars. Unfortunately the flour-gold is difficult to save where a high force of water is used; even the rockers are reputed to save only half the gold that goes into them. Then, again, while the digger works only the pay-dirt on a bar, the dredge has to shovel to a considerable depth in order to work itself ahead; having, in consequence, to handle a very large yardage from which no return can be derived.

EXTRACT FROM THE REPORT OF A. H. HOLLAND.

DATED DECEMBER 4TH, 1915.

[Mr. Holland was employed in 1915 by the British Columbia Government in making surveys in the Pre-emption Reserve, south of Willow River Basin, north-east of Prince George.]

The country is more or less heavily wooded with a growth of balsam, spruce, and some pine to 18 inches, which is of little commercial value and makes fairly heavy clearing, but the settlers could save some of the timber for railway-ties, for which there should be a constant if not heavy demand, and so lessen the cost of the clearing, which would otherwise run from \$50 to \$80 per acre.

This area would be classed as bench land, lying as it does from 300 to 500 feet above the Fraser River, and is practically level, though cut by the drainage of some small tributaries of the Willow River, and is all suitable for settlement save a few quarter-sections on the south, where there is a rocky outcrop, which is mineralized, and where during the past season several mineral claims were staked and some assessment-work done; though with what results I do not know.

The soil is clay or silt, with a subsoil of blue clay, and wherever cultivated has given excellent results to the settlers, whose gardens contained all kinds of root-crops. In one case, where oats were seeded, there was a splendid showing, indicating that the country is specially adapted for mixed farming.

There is abundant rainfall in the spring, and this year we had showery weather till the middle of July, followed by six weeks of extremely warm weather which averaged a minimum of 50° and a maximum of 80°, giving the best conditions for ripening the crop before the first frosts of the season, which this year came on September 9th; and then only of a few degrees, so that some root-crops were not raised until the last week of the month.

The majority of the settlers on the ground are making a good showing, slashing and clearing from 3 to 10 acres each, besides putting up good cabins, and the action of the Government this year in building roads and trails in this district will help the settlement wonderfully.

The game of the country is not abundant, seemingly being driven back by the railway-construction of the last few years and by incoming settlers, but we saw many signs of moose and deer in the autumn of the year, and the small game, such as grouse and rabbits, are plentiful.

Living costs in this district are also much lower than they have been in my experience of the country for the last five years, as the settlers are no longer handicapped by having to pay enormous freights as in the past, there being none of this area more than 8 miles from a station on the railway.

EXTRACTS FROM THE REPORT OF R. W. HAGGEN.

DATED OCTOBER 31ST, 1916.

[Mr. Haggen was employed in 1916 by the British Columbia Government in making surveys in the valley of the Quesnel River and in the vicinity of McLeese Lake (formerly known as Mud Lake) near Soda Creek.]

The only agricultural land in the Quesnel Valley consists of benches at varying heights above the river; the entire valley has been burned over and denuded of a cedar forest, in the place of which brush and second growth has come up. In many places this growth is light and land-clearing is not expensive, costing from \$10 to \$30 per acre. The soil on the benches is a deep loam. Irrigation, while it ensures a crop, is not, as a rule, necessary; there are a number of creeks in the valley which provide water for nearly all the benches. This year, which was exceptionally dry, did not spoil the grain or vegetable crops in the Quesnel Valley; Gerimi Gravel, who has a ranch at 26-Mile Creek, had oats standing 6 feet high, and his vegetables also did well. There are no hay-crops in the valley, the settlers feeding straw or oat-hay to their stock.

Mr. Gravel has 50 acres under crop, and now has a flock of 450 sheep, which do well and show a good increase each year. He also has cattle and hogs. This is the only pre-emption in this part of the valley which is worked to any extent; on the other places a few acres only

are cultivated, sufficient to supply the vegetables for the settler and to grow enough feed to winter a couple of horses. These pre-emptors have to depend on outside work for their grub-stake; they have not stocked their pre-emptions, and, if there was a market for grain and vegetables, they would in every case have to bring considerable extra land under cultivation before enough crop could be raised to support them.

The land in this valley will always be between 16 and 20 miles from the railway, and probably the only branches of agriculture that will be profitable will be hog and sheep raising, for which the valley seems well adapted. The one drawback is the coyote pest; this necessitates the expense of constantly herding the flocks.

From the mouth of Morehead Creek it is only about 6 miles by the Quesnel Valley to Quesnel Forks, but the valley is rough, and the road follows up the valleys of Morehead and Little Lake Creeks until it joins the main road to Quesnel Forks from 150-Mile House at Lot 394, where the Hydraulic Post-office is situate. At this point S. C. Prior has a hay-ranch and store. Mr. Prior has for a number of years traded and packed in this section, and to him I am indebted for considerable information as to topographical features at more remote points in the district.

From Lot 394 I made a traverse of the main road westerly to the dam at the foot of Morehead Lake. This is a "made" lake, the water being penned back over a considerable area of fairly level land, and it is $2\frac{1}{2}$ miles long by $\frac{1}{2}$ mile wide. The dam was put in to conserve water for the Bullion Mine a number of years ago, and a large ditch with considerable fluming was made to the mine. Along the road from Lot 394 the country has been burnt off and fairly dense brush has grown. Near Lot 394 there is a rank growth of clover in the timber, and this is cut for hay.

The road from Lot 394 to Quesnel Forks was next traversed and the lots at the Bullion Mine tied in. The Bullion Camp, which lies about 3 miles from Lot 394, is the most up-to-date mining camp, in so far as buildings are concerned, that it has been my privilege to see in the Province. The buildings are large, well-built, and numerous. The mine ranked among the foremost producers of the Province some fifteen years ago, when under the management of the late J. B. Hobson. There is a tremendous yardage of cement and gravel on the hill to the west of Quesnel River, and it is reported to yield from 6 to 8 cents per yard. I am informed that the shipments have totalled \$1,600,000, but unfortunately the expenses exceeded this sum. The mine was subsequently disposed of to the Guggenheims, who dropped it, and it has latterly been the subject of a dispute as to ownership. There was never enough water available from the sources used—Morehead, Bootjack, and Polley Lakes—to work the mine to its full capacity, and a start was made on a big ditch from Spanish Creek. While this ditch was under construction the mine was closed down. However, as it is a mine of considerable value, it is by no means improbable that it will be reoperated in the future.

Two miles below Bullion F. J. Whitmarsh is doing prospecting, and has anthracite coal and also silver. However, I do not know whether the latter is of commercial value, as the investigation of the amount available is not yet far enough advanced to form an opinion. Anthracite coal is only of use for a local market should one develop in the future. I have no knowledge as to the dimensions of the seam.

Descending a steep hill, the road crosses the Quesnel River and enters the townsite of Quesnel Forks. This village is beautifully situated on a flat at the mouth of the North Fork, and was, some years ago, a town of some importance. There were good stores and a couple of hotels, while the Government office was also located here. Fires have destroyed the best buildings; there are no hotels, and three white men are now resident in the town. There is a store, post and telegraph office. The traveller must carry his own blankets if he would stay in the town; but the Ritz Café, operated by a Celestial named Herr Tom, is established to supply the wants of the inner man. The pretentious sign announces that "Ici on parle Francais" and also "Mann sprach Deutsch," but, as far as I could ascertain, Chinese and "pigeon" English are the only tongues the would-be linguist has mastered. There are several Chinese at the Forks who make a living by washing gold along the Quesnel River, and they also operate a pack-train to Keithley, 18 miles distant, on Cariboo Lake.

On the opposite side of the North Fork Mr. Lowden has a small ranch on which he grows hay and produce for the limited local market. From near his ranch a trail is reached; this runs from the old bridge near Kangaroo Creek to the old Maud Mine, at Maud Creek (formerly known

as 4-Mile Creek). However, the Maud was not a producer and no work has been done there for a number of years.

Six miles from Quesnel Forks the Keithley Road leaves the vicinity of the North Fork, and here branches the old trail to Keithley Point, where the North Fork bends. From Cariboo Lake to this point the course is southerly, but from here to Quesnel Forks it is westerly. I traversed this trail for 3 miles, tying in two pre-emptions and Lot 218, the old Keithley Point Hydraulic Claim, which has not operated for a number of years. At this lot there was an old bridge to which a trail ran from Quesnel Lake via Coquette Pass; this bridge has, however, been washed out. Spanish Creek enters the North Fork near Keithley Point.

The final traverse made in the locality was from Quesnel Forks to the dam at the mouth of Quesnel Lake. This traverse follows a road which runs along the north side of the Quesnel River. The country here is very rough and of no great value. However, there has been mining done at Rose Gulch, 3 miles from the Forks, and also near Lot 392.

The dam is a nice piece of work. It was built in an arc across the old channel of the river at the foot of the lake, and the water was diverted into a runway to the north of the old channel; here are the gates, and through them and down the runway the river runs furiously. I believe that the object in erecting the dam was to enable the water to be shut off from the main channel of the Quesnel River, so that the gold in the river-bottom might be easily gathered. However, in previous years a number of old-time miners and Chinese had wing-dammed the channel and got gold that way, and the company operations were not a success.

A bridge has been built at the dam, and from here a road runs westerly, joining the main road from the Forks to 150-Mile House near Bullion. A road also runs to Spanish Lake. On this road are two steam-shovels which were used on the construction of the projected ditch from Spanish Lake to Bullion.

Quesnel Lake is a magnificent body of water, flanked by high hills and 70 miles in length. It heads near the Clearwater Valley, there being only a low divide between. On Quesnel Lake and on the North Fork of Quesnel River there is a good forest of cedar which will ultimately be logged, provided it does not fall a prey to fire.

Having completed the work in this locality, I moved to McLeese Lake, 7 miles from Soda Creek, in which locality I surveyed fifteen parcels of land; thirteen of these were held under pre-emption record, and the remaining two are under reserve, one being the Soda Creek school-site. These comprise 2,063 acres.

The lots near McLeese Lake are easily accessible by road from Soda Creek, with the exception of Lot 9171, which lies on a nice flat on the summit of the plateau and is reached by a rough road from Peavine Valley. This lot contains a large percentage of good land, but there is no water. Irrigation is unnecessary for raising grain and vegetables in the locality.

The other lots do not contain any great amount of good land, consisting of small flats and steep hillside. They are all of some use, however, and, if a market were available, could afford a living to a settler. Practically all the pre-emptors from this locality have enlisted and the names of a number have appeared in the Roll of Honour.

Lot 9170 was surveyed to include a pre-emption on the head of Cuisson Creek, where the settler, Alford Pierce, has done a great deal of work and has a very nice-looking ranch. Crops in this locality were a disappointment this season, where there was no water available for irrigation, as the spring was backward, dry, and cold. Heavy rains in July brought on the crops which had been planted late, but the early crops were a total failure; in some cases the potato-crop, usually good, was only 10 per cent. of the normal crop. The frost also caused trouble in some cases, coming a full month earlier than usual and ruining the wheat in some localities. Climatically it has been the worst season I have seen in the district, and I am quite ready to believe the assertion of some old residents who class it as the worst season ever known. This condition extended along the Fraser Valley, while the Quesnel Valley was immune. Such a season is, fortunately, quite exceptional.

Another point forcibly impressed on me was the great shortage of game. No deer were seen during the season and very few grouse. Coyotes are numerous, but a number seen were in bad condition, thin, and suffering with bad mange. An athlete could almost run them down. Bear are numerous in the Quesnel Valley and were seen nearly every day. In the Quesnel River, below the dam, there is good trout-fishing. A few trappers on Quesnel Lake have had good luck catching fur in the winter.

EXTRACT FROM THE REPORT OF F. P. BURDEN.

DATED NOVEMBER 13TH, 1916.

[Mr. Burden was employed in 1916 by the British Columbia Government in making surveys in the vicinity of Eaglet Lake.]

PHYSICAL FEATURES.

The parcel north of the lake is about $2\frac{1}{2}$ miles distant and 400 feet higher than the lake itself, and lies at an elevation of about 2,300 feet. Immediately north of this tract is Eaglet Mountain, which has an elevation of about 3,100 feet. It is chiefly a rolling country, with a general slope to the south. There are numerous small creek-beds which undoubtedly carry water during the spring and early summer, but we only encountered three with running water at the time of survey.

The parcel to the south of the lake is about $1\frac{1}{2}$ miles distant from the lake. It is more broken than the northern parcel and is more heavily timbered.

MEANS OF ACCESS.

The Grand Trunk Pacific Railway runs along the south side of Eaglet Lake, which gives the intending settler easy access to the land. During the season a horse-trail was built from Giscome Station through the centre of the northern block. A wagon-road has also been started from the western end of Eaglet Lake with the intention of penetrating this block, but at the present only about 2 miles of this has been completed.

On the south side of the lake a wagon-road has been built from Giscome Station to the block surveyed. There is also a trail running from a point east of Giscome to this block.

INDUSTRIES.

A start has been made towards the establishment of a lumber business at Giscome Station. A large mill is being erected, and only the shortage of labour prevents the employment of a large number of men at this point. As it is there are about fifty men employed, and the milling company is advertising for a hundred more. Its limits adjoin the northerly block on the west, and when these are logged a considerable area of good agricultural land will be available. In this connection it might be pointed out that there is an excellent place for the development of power at what is known as the little canyon on the Willow River. This lies about 3 miles south of Giscome and will doubtless be utilized at no very distant date.

NEAREST TOWN, ETC.

The nearest town is Prince George. This, with the villages adjoining, has a population of approximately 2,000. A town was started at Willow River, a point about 7 miles west of Giscome, but at present there are very few people living there. There is a store and a school there, and the probabilities are that there will soon be the same at Giscome. There is a post-office there at the present time.

SOIL.

In general, the soil is a clay loam or silt on a clay subsoil. There are numerous willow and alder bottoms, particularly on the north side of the lake, and where these occur the soil is a heavy black loam, very fertile and productive when the roots are removed. Ridges of gravel and sand are found on the southern block, and to a lesser extent on the sections adjoining Eagle Mountain.

CLIMATIC CONDITIONS.

Winter may be said to be of about six months' duration. Snow usually falls about November 1st and remains from that time until about May. During this period there is a heavy snowfall averaging about 4 feet. There is also a period of intense cold usually lasting from ten to fourteen days. Otherwise the winter climate is a desirable one. The days are bright and crisp, with frosty nights. During the spring and early summer there is an abundant rainfall. August and September are usually fine. This year there were three days in August on which rain fell, while September had nine. This is more than the average for September, but, on the whole, farmers have ample time in which to harvest their crops. Frosts came somewhat earlier this year than

ordinarily and were more severe. First frost was noticed on September 9th. This damaged the potatoes and in some places the wheat and oats. But usually these crops are matured without suffering from frost.

TIMBER.

On the northerly tract there is no merchantable timber. Scrub spruce and balsam predominate, with considerable poplar and birch. This might be valuable as pulp-wood if there was a mill within a reasonable distance. Cost of clearing under present conditions would run from \$75 to \$100 per acre.

On the southern block there is some merchantable timber, chiefly spruce, with scattered clumps of fir running up to 4 feet in diameter.

GAME.

Moose are quite plentiful in this region, several having been killed by hunters during the season. There are also a few deer, but they do not appear to be very numerous. Among the fur-bearing animals found in this vicinity are beaver, marten, mink, otter, fisher, and lynx. These, however, have been almost entirely trapped out, particularly the beaver.

Eaglet Lake is well stocked with trout, and good catches are sometimes made in Willow River also; but, except in periods of extreme low water, this stream is usually too muddy to permit of successful fishing.

EXTRACT FROM THE REPORT OF H. C. BLACK.

DATED DECEMBER 4TH, 1916.

[Mr. Black was employed in 1916 by the British Columbia Government in making surveys in the vicinity of Vanderhoof.]

My season's work lying between Vanderhoof and Bednesti to the south of the Grand Trunk Pacific Railway, I outfitted at Vanderhoof and commenced work at Beaver Dam, about 24 miles distant, near the south-west end of Cluculz Lake and on the Quesnel Road, which, coming from Fort Fraser, joins the Vanderhoof Road at Sinkut Lake. The road is good and so far it is all through surveyed land. A branch road starts from here and connects with the Vanderhoof-Fort George Road and Hulatt, where there is a small store and post-office. The grades on this road are good, but it still requires stumping. The distance to Hulatt is about 12 miles. The nearest post-office to Beaver Dam is Mapes, about 9 miles westerly on the Quesnel Road. The Dominion Government Telegraph Line follows the Quesnel Road closely, the nearest offices being at Tachick and Naltesby Lakes.

The country through which the road passes from Beaver Dam to Naltesby Lake is timbered with small jack-pine, with a strip of fir coming in at Eulatazella Lake. This pine country is dotted over with small meadows and swamps. Many of these swamps are dry in summer, but have a spongy surface covered with "birch-brush." The soil is mainly a stony silt.

From Eulatazella Lake I moved north along Norman's Road, which is, however, more of a pack-trail than a road and has been mainly used in the winter to Cluculz Lake. The country to the south of Cluculz Lake is similar to that along the Quesnel Road, but is flatter. From here I moved to Bednesti Lake, sending the horses round by Norman's Road and the west end of Cluculz Lake to the north shore, where they picked up the camp outfit. There is a trail from the north shore, at about the middle point, to the Fort George Road, which the horses followed to a road turning off to the west end of Bednesti Lake. The rest of the party went up Cluculz Lake to the east end by boats and then by the Stony Creek Trail, which is open here, though closed along the lake by windfalls. From here to the east end of the lake we took the horses along the Stony Creek Trail, which is in good order and follows along a series of steep gravel ridges enclosing small basins, which were once apparently ponds, but now meadows or swamps. They are of little value as they are small, and some of them could not be drained, being entirely surrounded by the ridges. These ridges continue till the trail joins the main road. From the junction easterly the country is timbered with jack-pine, with little or no undergrowth. To the west of the junction a road branches off to the railway at Nichol, where a post-office was established in September. This road, though still unstumped, has a good



AN OAT-FIELD, HORSEFLY VALLEY.



WOODJAM RANCH, HORSEFLY RIVER.

grade down to the river, though the country on either side drops somewhat suddenly. On descending to the river the jack-pine gives way more and more to spruce, poplar, and birch. The soil in this locality is mainly silt.

Various trout, some of large size, are abundant in both Cluculz and Bednesti Lakes, though perhaps the latter is the better in this respect, and brook-trout are numerous in Tachintelachick Creek. Grouse were scarce this year, though said to be plentiful as a rule. Deer and moose are seemingly fairly numerous by the number of tracks seen. Rabbits have dropped, in the last two year, from a superabundance to a scarcity, and the coyotes are visibly suffering from the want of their usual food.

The climatic conditions this year were not good, a dry spring being followed by summer frosts. I found one settler, however, who was trying out apple-trees, and though this was their first year they had escaped the frost. This may have been due to the land being high above the river.

The water problem of unwatered land is being attended to by the Government boring plant. Several boreholes have been put down this year north of Vanderhoof. One of them, completed just before I left, was sunk 200 feet to tap the water, but the water then rose to within 13 feet of the surface. The drilling-rig, which is mounted on wheels so as to be easily moved from place to place, is of the percussive type, the chisel being worked by means of a rope.

EXTRACT FROM THE REPORT OF F. TUPPER.

DATED NOVEMBER 17TH, 1917.

[Mr. Tupper was employed in 1917 by the British Columbia Government in making surveys in the vicinity of Moffat Creek and Horsefly River.]

AGRICULTURAL POSSIBILITIES.

With regard to this Horsefly country, it cannot by any means be classed as an agricultural district. The elevation for the most part is too high and summer frosts are frequent and severe, which make the growing of grain, etc., very uncertain. It is, however, good stock country, and stock-raising is what the pre-emptors purpose going in for.

The areas they have taken up are very suitable for the growing of hay and winter feed generally, while they have unlimited range on which to run their stock in the surrounding country. Several of the settlers experimented with oats during last season, but they failed to ripen. Root-crops, such as carrots, turnips, mangels, etc., did well, but potatoes were an absolute failure this year.

The country is well watered by numerous lakes, sloughs, creeks, etc. The timber consists, for the most part, of jack-pine and poplar, with a little fir in places. There are numerous small swamp-hay meadows from which considerable quantities of swamp-hay can be obtained.

TRANSPORTATION.

The country is very easy of access by the Horsefly Road, which runs from the 115-Mile House, on the Cariboo Road, northwards to Harpers Camp, thus running right through what is known as the Horsefly country. There is also a branch trail running eastwards from a point about 3 miles north of the 52nd parallel on the Horsefly Road to Eagle Lake. This is known as the Eagle Lake Trail, and is very rough at the present time, but could with comparatively small expense be made into a good road.

The Horsefly Road at the present time is in rather a bad state of repair; many of the culverts badly need renewing, and in some places the road has become somewhat overgrown with brush, etc. The whole of this Horsefly country is within easy distance of the Pacific Great Eastern Railway.

CLIMATE.

During the summer months the days are long and warm, but, as before stated, summer frosts are frequent and severe. The average rainfall is said to be about 15 inches. The snow-fall is heavy and the temperature occasionally goes as low as 60° below zero.

GAME.

Game is fairly plentiful. Deer and bear can be got with comparative ease in the hilly country, while, in the fall, ducks of all kinds abound on the lakes and sloughs. Grouse have become very scarce during the last two years. Two successive severe winters and horned owls are said to be the cause of this. A few years ago they were very plentiful.

CONCLUSION.

In conclusion, I would state that in my opinion this country is well suited for stock-raising, but unlimited range or large holdings are necessary to make a success of it. Owing to the altitude and the climatic conditions generally, farming, I think, will not prove a success and is not likely to be attempted to any great extent.

EXTRACTS FROM THE REPORT OF R. W. HAGGEN.

DATED OCTOBER 8TH, 1917.

[Mr. Haggen was employed in 1917 by the British Columbia Government in making surveys in the vicinity of Soda Creek and Alexandria.]

The first work of the season was the location of the old townsite of Soda Creek and the survey of additional lots within it. The original survey of this townsite was made in 1863 by one of the Royal Engineers; he showed the position of old buildings on his plan, and these buildings are still standing as portions of the present buildings. Though numerous patches show where fires have started, they seem to have a charmed life; and these buildings at Soda Creek are probably the oldest in the Cariboo. The town came into existence at the time of the gold-rush in the late fifties; at that time a steamer was built at Soda Creek and operated between that point and Quesnel, at which place the road to Barkerville leaves the Fraser River. Being the foot of navigation, Soda Creek became a village of importance in the country, and was for some years used as a supply-point for the Chilcotin District, and also, partially, for the Beaver Lake and Quesnel Forks Districts.

Until 1915 steamers continued to operate on the Fraser, and Soda Creek was the southern end of their run, so retained a certain amount of trade. After that, owing to a change in mail service, the steamer was replaced by a gasoline-launch plying between Quesnel and Fort George only, and to-day Soda Creek is practically without transportation and very little business centres there. By the building of the bridge at Chimney Creek the 150-Mile House was made more convenient to Chilcotin and the trade of that section was diverted.

Soda Creek may be considered as the northern limit of the Dry Belt extending along the Fraser River. Fruit does well in the village and corn and tomatoes can be ripened every year. There is considerable good farming land tributary, but owing to absence of market it is not being worked to full advantage. All the beef available in the district has found a ready market this year, while sheep and wool have also been sold. A number of pre-emptors are, however, staying on their holdings, and whenever the Pacific Great Eastern Railway is completed there should be a good production from the district.

The two largest ranches near the village are those of Messrs. Hargreaves and Hoops, both of whom have large areas in crop and run fair bunches of cattle. Cattle and sheep can be driven to markets, but freight cost is so high that the export of grain or produce is out of the question.

After leaving Soda Creek I proceeded to the vicinity of Macalister, 13 miles to the north, from which point I surveyed some tie-lines and a couple of pre-emptions on the hill to the east of the Fraser Valley. The pre-emptions are taken up on account of some hay meadows, and the settlers have done considerable work in clearing and draining them. Apart from the meadows, the country is rough and rocky, the vegetation consisting almost entirely of jack-pine.

From Macalister I moved over the road which passes the north end of McLeese Lake to the Big Camp meadows; this road continues to Beaver Lake, where it connects with the road from 158-Mile House to Quesnel Forks. In this locality I surveyed two pre-emptions, and made ties, connecting the outlying lots with the surveys in the Beedy Creek Valley. The pre-emptions are both taken up for hay-growing, one containing a natural meadow and the other a piece of good bottom land; their altitude is too great for anything except hay-growing. Apart from the meadows the land is of no value; it is rather stony and the soil is poor, while there are hard frosts every month in the year. No attempt is made to grow vegetables, except of the hardy

varieties, and they do not do well. However, the hay grows to a great height, while in the woods there is a luxuriant growth of soft feed for cattle. Mr. Foster, at Big Camp, and Mr. A. P. McInnes, on Beedy Creek, both have small herds of cattle.

From Whitestone Lake, the easterly limit of my work, I made a trail to Tyee Lake, and then surveyed more pre-emptions and ties in that locality. At Tyee Lake there are some patches of excellent soil, a deep black loam. The altitude, 2,800 feet, would lead one to expect that summer frosts would be too severe to enable good crops to be raised, but for some reason this locality seems to enjoy a certain immunity. The only garden there was in excellent shape and good potatoes were obtainable during the first week in August. Other garden produce was in good condition. In the country surrounding there is a considerable amount of cottonwood, with jack-pine and some fir. There is a luxuriant growth of peavine and vetch—excellent summer feed for fattening cattle for the market, provided they can be killed for a market close at hand. While cattle fed on this feed will be in excellent shape for beef in the fall, they are too soft to stand the drive to the present market, 150 miles distant; it is the stock fed on the harder feed, such as bunch-grass, that stand the long drive. When the railway is completed the district in the localities of Big Lake, Beaver Lake, and Tyee Lake should be able to produce good beef, selling it at good weight when 2 years old. It should also be a good country for raising hogs and for mixed farming generally.

Tyee Lake is about 24 miles from the 158-Mile House, on the Cariboo Road, and 15 miles from Soda Creek; roads run to both points. The lake is 4 or 5 miles long, a very pretty body of water, and drains through Marguerite Lake to Beaver Creek, a tributary of the Quesnel River. I was somewhat curious to find out whence the name "Tyee." A night-line solved the conundrum, the lake abounding in ling of large dimensions. Fish formed a very welcome addition to the camp menu and were a welcome change from ancient bacon. No trout were caught, though there are reported to be plenty in the lake. There are shoals of whitefish.

From Tyee Lake I continued the surveys in the direction of Soda Creek, surveying several pre-emptions and making a tie which will enable the country to be shown in good detail on the maps.

Ascending a hill from Tyee Lake, one soon reaches the upper waters of Soda Creek, which comes out of a lake to the north-west of Tyee Lake on a high ridge. After the creek crosses the road it flows through several meadows, eventually reaching Peavine Valley, a narrow pass, in which the country is open. This valley is deceptive. On first looking at it one forms the opinion that it is splendid land and can easily be irrigated from Soda Creek and two creeks which enter from the hill to the north. However, these creeks go underground as soon as they enter the flat, and attempts at irrigation have been a failure, as the water always sinks. Moreover, it is an exceedingly frosty valley, and would seem to be useless for anything except pasture. There is no sign of the creek throughout the greater portion of the valley, which is about 4 miles long; the creek comes out of a cliff again below the Peavine Valley at Lot 9480.

The two pre-emptions surveyed on the creek above Peavine Valley contain meadows of good size but poor quality. However, time and drainage may make them of value. The other pre-emption contained a bench on which there is good soil and some open land. However, the area of this is small.

In travelling from Tyee Lake to Soda Creek Townsite there is a short cut over a trail which passes to the north of Peavine Valley. This trail is a portion of the one originally built from Soda Creek to Quesnel Forks, and when one travels over it the fact becomes apparent that trail-building is now a lost art. The old bridges are now rotted out; but signs are still to be seen of grading and drainage which at small cost enabled a trail to be built over which a horse could carry a good load—I should think as good a load as it could carry on the main roads to-day. I have not seen a trail built in more recent years that compares with this for sensible construction. The road follows the trail from Tyee Lake to Big Lake.

On the ridge to the north of this trail there are some copper claims, and I understand the assays show the quality to be good. However, until the railway is completed, nothing is likely to be done with these claims, and under the best circumstances they will be about 12 miles by very hilly road from a station.

After completing this work I surveyed four pre-emptions within a short distance of Soda Creek, one of them being at Morgan Creek, one at the confluence of McLeese Creek and Soda Creek, and two along the Cariboo Road to the north of Soda Creek Townsite. They are all

decidedly hilly, containing only a small proportion of arable land, but all having a certain amount of merit. Grain and vegetables can be raised in the district without any necessity for irrigation, and these can be raised on the pre-emptions mentioned. Where Soda Creek comes out of the cliff near the east boundary of Lot 9480 it brings a deposit of a whitish substance, whence the name "Soda." I do not know what the correct name of this deposit is; while it has been assayed many times, I have never heard the result, except that it is said to be of no commercial value. I have never seen a deposit resembling this anywhere else, and it lies in the creek-bed 30 and 40 feet deep. In appearance it is silicate.

Having completed the work in the vicinity of Soda Creek, I moved to Cuisson Lake, about 10 miles south-easterly from Alexandria, and continued the work started from Macalister earlier in the season, carrying on surveys from a tie made at that time. Two pre-emptions were surveyed at Cuisson Lake and a tie made to Lot 9170, at the south end of the lake.

The land here consists of some hay meadows and good patches of land near the creek, where the soil is a loam and the vegetation consists of poplar and willow. In favourable seasons good garden produce can be raised, and hay grows excellently without irrigation. An Indian has been on one place near the lake for forty-three years and has a fair crop each year.

Cuisson Lake is about 3 miles long, lying in a north-westerly direction, and being near the head of Cuisson (4-Mile) Creek, which crosses the Cariboo Road and enters the Fraser River at the 190-Mile post, Alexandria. The Indians do some fishing in the lakes; there are some trout and the usual lake assortment of squaw-fish and suckers, which the Indians appear to relish. Cuisson Creek, after passing through this lake, drains through several lakes and hay meadows for about 5 miles of its length. These are all included in former surveys, except one brushy meadow, which is now held under pre-emption record, and which I surveyed as Lot 9485, lying to the north of the former surveys. It is probable that all these meadows can be drained, though it will take time; if they are drained the area of hay land thus reclaimed will be large and sufficient to provide winter feed for a large number of cattle.

I surveyed another pre-emption to the west of the largest of these meadows. A Dane has taken it up, and I was agreeably surprised at the improvements he has made on the place; though in occupation for a comparatively short time, he has put a good fence around the place, cleared and drained a good portion of meadow, and built good buildings. If he had some stock there would be no difficulty in making a living off the place in its present shape.

I surveyed two more pre-emptions to the east of the Alexandria Indian Reserve; they consist of a little bench land near the road which runs from the reserve to Cuisson Creek, and, with the exception of this bench, are very hilly. There is a growth of fir around them. These settlers have built good houses and done a little clearing. One, however, has answered the call to arms, and the other has found it necessary to work away from his place a good deal, so very little work other than building has been done. Each of these places will raise small crops, the area of arable land in each case being rather small.

The last survey made was that of a pre-emption near the head of Alix Creek, about 3 miles to the east of Moffat's ranch, on the Cariboo Road. This lot contains some bottom land near some small lakes and will raise fair crops. The settler has done some building and considerable improvement.

At this time the weather became very inclement and there were as severe storms as I have ever seen in the district.

The two industries of the district are agriculture and mining. The former is the industry of the greater part of the district; the latter, of the Barkerville and Quesnel Forks localities. The Tertiary Mine, at Cottonwood Canyon, about 20 miles above Quesnel, on the Fraser River, has employed on an average about eighteen men all season, and the Cariboo-Chisholm Creek Company has employed about the same number at Van Winkle, in the Barkerville region, opening up a new property there. The work done so far on both properties is purely development; the indications are that both will be successful ventures. In addition to this there was the usual amount of placer-mining carried out in the Barkerville District.

Quartz-prospecting has attracted more attention than formerly during the past season. Two ledges of promise have been found—one gold-bearing near Barkerville and the other carrying copper and lying about 2 miles east of Cuisson Lake. The discoverers have been working on these ledges all season, but I understand that to date sufficient work has not been done to prove up the extent. Mr. Galloway, of the Mines Department, was on the ground this season.

Gold-washing on the Fraser and Quesnel Rivers, which attracted a number of men a couple of years ago, is now practically abandoned. This employment yielded a labourer's wage during the season, but, with the present demand for labour, men can do much better elsewhere.

The season was a good one for the mining companies, there being more water available than in the average years. The season was also good for the farmers and the crops of hay were well above the average; while grain and vegetables did well in all sections of the district. A number of cattle and sheep were sold this season, there being a good market for these.

Very little game was seen throughout the season. Deer seem to be no more plentiful, but the grouse, which had nearly disappeared, are more plentiful again. There are some bear.

EXTRACT FROM THE REPORT OF F. P. BURDEN.

DATED OCTOBER 10TH, 1918.

[Mr. Burden was employed in 1918 by the British Columbia Government in making surveys in the vicinity of Moose Springs, situated to the south of Prince George.]

I have the honour to submit a general report on the country surveyed by me during the present season. The portion surveyed lies about 25 miles from the City of Prince George in a southerly direction, and is traversed by the Fort George-Blackwater Road. The immediate vicinity in which most of my work was done is known as Moose Springs, a name derived from a large spring of excellent quality situated beside the road in the pre-emption of O. B. Hughes.

Generally speaking, this is a rolling country, having low-lying hills or ridges, usually running from north to south, with level benches or level depressions between. As before stated, the Fort George-Blackwater Road runs through this region and provides the only means of access thereto. For a road in a new country it is in reasonable shape and is being improved from year to year. Cars can now run over it, though it can hardly be called a motor-road. Branching off from this, about 2 miles south of 21-Mile, is a settlers' road, built by pre-emptors to enable them to reach their locations. It extends south-easterly for about 8 miles, but is hardly passable in spots and is built with but little attention to grades. The nearest post-office and market is at Prince George, reached by the wagon-road above referred to.

During the summer considerable prospecting has been done in this vicinity and a number of claims having good copper-showings have been located. No development-work has yet been done, but interest is being aroused in this part of the district, and it is only a question of time until systematic prospecting and development will prove or disprove the presence of minerals in paying quantities.

The soil on the ridges is usually a sandy loam or gravel. On the level benches or valleys it is a black loam or chocolate-coloured loam.

Very little farming has been done, but excellent results have been obtained in gardens, all manner of vegetables being produced, and of fine quality. Remarkably fine sugar-beets were growing in Duncan MacKenzie's garden, while the potatoes in O. B. Hughes's garden were unsurpassed by any I have seen this season. Small fruits also flourish, but fruit-trees have not yet been tried, although a few miles east, on the shores of West Lake, I believe apples have been grown.

This area, with the exception of a few wet meadow-like spots, is thickly wooded, with jack-pine and poplar predominating. In some places the jack-pine is large enough for tie-timber. Under the ordinary methods of first-hand clearing the cost would run from \$40 up to \$75, but doing this on a large scale with the proper equipment, this could be reduced 50 per cent.

During spring and summer there is sufficient rainfall to ensure a good growth, and there is a heavy snowfall in winter, lasting usually until May, and beginning to fall in November. Summer frosts are still a detriment, but I have no doubt the clearing and cultivation of fair-sized areas will do away with these to a great extent.

Game is fairly plentiful, moose and deer being the most important. Fair-sized catches of fur are still made every winter. This includes beaver, lynx, fisher, marten, and mink.

Altogether, this area compares very favourably with other portions of this district now being settled.

EXTRACTS FROM THE REPORT OF F. BUTTERFIELD.

DATED OCTOBER 23RD, 1918.

[Mr. Butterfield was employed in 1918 by the British Columbia Government in making surveys in the vicinity of Horsefly River and Quesnel Lake.]

These territories contiguous to Horsefly and Quesnel Rivers comprise only the oldest portions of our Province. History affirms that Peter Dunlevy, whilst at the mouth of Chilcotin River searching for gold, was directed by an Indian to meet him at a certain time and place. The appointment was kept and Dunlevy was introduced to what ultimately became the famous Horsefly mines. This was in 1858. For years afterwards there was a rapid influx of people to the Cariboo; indeed, the 1859 rush was directly responsible for the foundation of New Westminster. From Horsefly the miners extended energetic operations northerly, and Quesnel River (remarkable rather for inactivity at present) in 1860 gave employment to "600 miners, who earned from \$10 to \$25 per man per day." Since the decay of mining there has developed apparently an agricultural effort, sometimes more and very often less successful. The amount of success depends upon the varying conditions the individual farmer is called upon to contend with, and I believe, to a greater extent than in most places, upon his wisdom and foresight.

Every year he has to prepare for a five-month winter siege, during which time he must feed his stock; and every summer he hopes, against all expectations, the frost will spare his crops. The inevitable summer frost is a source of torment to the agriculturist. Unfortunately, owing to the high altitude of the district in general, it is problematical if the farmer can ever be immune from its scourges, as is the case in some of the "muskeg" districts, where clearing and drainage have been so beneficial. Here, as in all ranching localities at the present time, much difficulty was experienced during the past summer in obtaining hired help for haying. At the time of my leaving this had developed a serious aspect owing to exceptionally heavy precipitations and the necessity, in consequence, of handling hay rapidly. I understand, however, that September proved as exceptionally fine as August had been wet, so it is not expected there has been an undue depreciation in the hay-crop.

CHARACTERISTICS.

Horsefly River flows into Quesnel Lake about 16 miles from the lower extremity. In its course it drains probably 600 square miles of territory, flowing westerly and then northerly and discharging into Horsefly Lake. Quesnel River, or at least that portion of it with which I have to deal, drains Quesnel Lake, making its confluence with the North Fork at Quesnel Forks about 7½ miles distant from the lake. The only tributary to these waters of any importance in this report is Moffat Creek, which flows northerly, uniting its waters with those of Horsefly River at the big bend. The creeks flowing into the included section of Quesnel Lake are insignificant; the largest is only a few links in width.

The most notable characteristics of the country are its narrow valleys and usually high hills. These are more marked on approaching Quesnel Lake and Quesnel Forks. Indeed, the old mining town of Quesnel Forks is literally hemmed in. There is much available grazing territory above Horsefly Bay, but little or no agricultural land of any description from there to Quesnel Forks.

Harpers Camp, the most populated settlement, is situated near the junction of Moffat Creek with Horsefly River. It marks to all intents and purposes the end of communication and the Horsefly Road.

TIMBER.

There is no lumber industry in any part of the district, to my knowledge; none is imported, as, when needed, boards can be whipsawn from convenient local timber. Although no merchantable timber came under personal observation, I am informed there are several good tracts that could be profitably cut were export facilities improved. Tracts of timber are reported to exist on Quesnel Lake. The lower end of the lake, however, suffered from fires some years past, leaving little but the stubs of what has at one time been a good stand of fir. Ninety per cent. of the remaining cedar, it might be said, is hollow.

MINING.

A more comprehensive knowledge than I possess is necessary to do this subject justice. There are still men in the district of clear memory who can look back to the days of '63 and converse on minutest details. Most of these, in company with other younger men, are of opinion Cariboo has yet much gold in store. At the present time mining is very quiet. Assessment-work, which usually means minimum work, is carried on as a matter of course. A company operating at Harpers Camp, which only recently put its plant in working-order, is using an ingenious dredge calculated to handle most dirt in least time. Up to present date its energies have been expended on old tailings, but results, as yet, have not been disclosed. It is rumoured that the Bullion, a well-known mine on Quesnel River, will be working again when conditions are favourable. Gold appears to be the only mineral which receives any consideration, although it is well known the mountains contain much of the baser metals. Prospectors are scattered here and there searching the creeks and old beds for new finds, while a limited number of older men content themselves with washing on their old claims. It would be pure presumption, however, to say they earn a living thereby. Horsefly gold is of the flour variety, while that of Quesnel River is said to be of a coarser nature. Shortage of water is somewhat of a handicap to the gold-miner. Many of the creeks emanating from small lakes have to furnish miners with this essential. Only too often these fail and operations cease in consequence. While the small water-courses are so uncertain, the large waterways are of a precipitous character and could be utilized as extensive power sources.

FARMING AND AGRICULTURE.

A dearth of vegetables in the Horsefly District, a condition which I am told prevails annually, this summer unmistakably pointed out the enormity of the summer-frost detriment. During June and July the only means of acquiring potatoes was that of having them brought in from 150-Mile House. On July 24th, when all truck-crops were promising very favourably, the district was visited with 10° of frost. Needless to say, this had temporarily a disastrous effect, more especially on potatoes. However, in the latter end of August, although their crops had been considerably retarded, farmers congratulated themselves on an improvement over recent years. Truth to tell, most agriculturists look upon the successful growth of truck-crops as the impossible, and therefore take no means to circumvent the ravages of frost. Usually they plant a small patch and leave its future for Providence to decide. I did see smudges in use on two occasions, but Jack Frost had already done his worst. As there is some local market for potatoes, etc., it would probably be worth some enterprising farmer's while to install an overhead irrigation system of sufficient height to permit ordinary agricultural operations. This might be used as a frost-preventive by employing a fine spray set in operation nightly, and would provide a readily available supply of water in case of an exceptionally dry season. I noted at various places much "common scab" amongst potatoes, in most cases traceable to seed, continuous cropping, or wood-ashes of bush fires. Old potatoes were hard to acquire and worth 5 cents per pound in July, and earliest new potatoes came in at the end of the month.

Crops are all late, due to late springs and insufficient heat in the soil for seed-germinating. This tardiness is unduly enhanced in some localities by wet soils with insufficient drainage. Drainage requirements are very marked in all lowlands, and the soils are usually sour in consequence. There appears to be a prevailing desire to create swamps rather than drain them, in order to have swamp-hay for cattle-feed; not that timothy will not grow—as a matter of fact, precisely the contrary is true. With a little care at the beginning one or two farmers have obtained luxuriant stands. Nevertheless, timothy is very scarce in a country well adapted for hay. If the past season was at all typical of a Horsefly summer, there should be no need for irrigation. The months of June and August were much too moist to suit survey-party tastes, while July, although drier, had quite an ample precipitation. Still some of the residents possessed of garden-patches complained of "drying out." Possibly this was true where the soil was of a coarse texture and friable nature, but the hillsides with their deep green appearance bore no supporting evidence. As stock-raising gives little trouble and good grazing can be found almost anywhere along the Horsefly or on neighbouring hills, it is the most remunerative and satisfactory form of agriculture practised. The stockman needs large enough holdings to guarantee sufficient range, an ample supply of water, and somewhat extensive hay meadows.

Having these assets, together with reasonable luck, he ought to be successful. The hay meadows are absolutely essential. As already stated, calculations have to be made for pro-

vision for five months' winter-feeding. Vetches and some form of clover resembling alsike grow luxuriantly, the latter especially needing only the encouragement of a little clearing. Beef is seldom consumed locally, mutton and bear-meat being the common viands of the district. Beef was recently sold at 11 cents on the hoof, but I think 10 cents is the more general price paid. Beef, hides, and furs, I believe, are the only commercial articles exported to the outer world. Demand for these as well as local consumption products exceeds the supply. Altogether there must be several hundred sheep in the district, and it is very gratifying to note, while coyotes are plentiful, they do not interfere with their successful increase. As small tracts of land will not furnish a living, the entertainment of communistic-settlement ideas is out of question here. Some complaints are heard of "winter-killing." As this is a direct consequence of excessive moisture, adequate drainage ought to be provided wherever it applies.

SOILS.

In a district whose soils are of different origins, or at least whose soils have undergone many different changes, it would be impossible to classify them without exhaustive study. No attempt has therefore been made, but some little notice was taken of soils in vicinities where surveys were in progress. Generally speaking, there appears to be some shortage of bases as is indicated in the higher lands; where, though, there may be little organic matter or moisture, soil shows slight acidity. This may account to some extent for the beautiful wild fruit gathered each year by residents of Harpers Camp.

FISH AND GAME.

The district of Horsefly and Quesnel Lake can only be described as a paradise for hunter and trapper. The large numbers of fur shipped annually, the beautiful heads of moose, caribou, and deer to be seen in settlers' cabins, and the tales that are told, all testify to this. Several families rely absolutely on trapping to earn their daily bread, while many are to a greater or less extent dependent on the same source of livelihood. Amongst animals trapped are bear, beaver, coyote, fisher, lynx, marten, mink, muskrat, otter, and weasel. Big game, comprising black and grizzly bear, moose, caribou, and deer, is most plentiful in the region of Quesnel Lake. Coyotes are responsible for the destruction of many deer, if the observations of residents are a base for calculations. Five deer were seen at one time last winter, driven down by coyotes and slaughtered on the ice of Quesnel Lake. Game birds are decidedly scarce, and rabbits, once so plentiful, are now seldom seen. This is attributed locally to the exceptionally severe winter of three years ago.

The fish-supply is quite on a par with that of game. Practically all lakes and creeks are well stocked with trout of varying sizes up to 10 lb. Quesnel Lake far exceeds this, rainbow weighing up to 16 lb. and char even to 40 lb. The largest fish taken by us measured 35 inches in length.

MOFFAT CREEK AND ALONG OLD WOOD JAM ROAD.

In the vicinity of Moffat Creek there are suitable lands available for settlement in small scattered areas. A large proportion of the lower lands, flooded by beaver and overgrown with a dense underbrush, carry a black muck soil, usually underlaid with sand of varying texture. The ground rises from the creek in benches, where a medium sandy soil of yellowish appearance with a fine whitish to yellowish-grey sandy clay subsoil is usual. Stony, even rocky lands are quite common, and above only applies to the better portions of a naturally broken territory. What has been said of Moffat Creek applies to lands to which the Old Wood Jam Road is tributary, only the proportion of rock to soil is greater in the latter. Soils formed by weathering of rocks on the innumerable small hills have through centuries been washed and deposited in the hollows. In addition, often small lakes and ponds have been created in these places, around the shores of which are found soils limited in extent, but rich in humus.

WOOD JAM RANCH AND VICINITY.

Range lands comprise the prevailing feature in the vicinity of Wood Jam. The ranch itself, which is spoken of almost as a mile-post, consists of about 600 acres, mostly range. At some comparatively recent date, a fire, said to have been caused by lightning, swept the hills west of here and south of the river, leaving little in its wake for the settler to remove. Mr. McKenzie (Wood Jam) has experimented two years with alfalfa, but has only had partial success, although

his experiments lead to the belief that, once established, alfalfa will be profitably grown. Hundreds of acres along the Horsefly River are flooded annually, a major cause for delayed spring operations. There has been some desire on the part of local farmers to have investigation made with a view to ascertaining the feasibility of shooting out the so-called "canyon" which is said to be responsible for this backing-up and resulting inundation. It has been said, if this were scientifically and economically performed, Horsefly River ought to pay its way by surrendering sufficient gold from the canyon to deplete expenditure. To say the least, this is very questionable. Such soil as there was a possibility of examining in the very little time at disposal, without interference with customary survey operations, proved to be a silty clay loam with little or no variation to a depth of 28 inches. It displayed slight acidity, no carbonate action, a considerable colloidal content, and in places a decided inclination to bake, though not so cohesive but what it would respond to ordinary cultivation practice. That specie of clover of which mention has already been made is very abundant in places.

Quesnel Lake is remarkable for scenic beauty and notable for historical relationships. Its expansive waters are well stocked with trout and char and its neighbouring hills teem with animal life. Although agricultural land along its shores between Horsefly Bay and Quesnel Dam is practically *nil*, in a few places settlers have established their homes.

These, most of whom make a living through trapping in their endeavour to become to a large extent self-supporting, have grown fruit, beautiful and in quantities far in excess of their needs, while their gardens this summer were a pleasure to gaze upon. Here frost had had no sway, the huge expanse of water no doubt controlling the temperature. The soil is usually of a brownish-yellow appearance, a sandy loam with clay predominating occasionally. All gradations in texture can be found from coarse gravel to silt. Much of the soil at first glance appears to be wholly gravel, but on closer examination much finer material is determined. Although the subsoil is finer, there is still a tendency for the soil to dry out; much therefore depends on rainfall. There are probably 1,000 acres near the mouth of Horsefly River of very good land that should be eminently suited to fruit-growing. This amount might be doubled at some future date should Quesnel Dam ever be removed. Quesnel Dam (at the foot of Quesnel Lake) was originally constructed to retain the waters of Quesnel Lake for brief periods while the gold was being removed from the bed of Quesnel River. From all reports the scheme was an absolute failure, and the dam, which assuredly was a great undertaking for a mining company, remains, serving no purpose, but holding the lake at from 10 to 12 feet above its natural level. The dam itself will resist all nature's attempts at reduction for many years to come, but the gates are already giving, and their entire failure, unless given attention, may be expected any time. In such an event it is difficult to predict the ensuing consequences. It seems highly probable the current will cut away the bank on the north side of the gates (indeed, this is already taking place) and form a new channel. As the bank at this point and for some distance below is high and steep, the wagon-road which traverses the side-hill would naturally be damaged. If the lake should become rapidly lowered it is quite probable the freeing of such a huge volume of pent-up water would do damage at points lower down the river. Evidence of the former lake-level is visible everywhere. Standing dead timber out in the lake (at Horsefly Bay to distance of half a mile), almost total absence of beach where formerly it is said an auto might have been driven, and also Mitchell's Landing on the north side of the lake, where pack-trains were disembarked in early days after being ferried across from Mitchell's Bay, all furnish ample proof. This landing is now observed from a boat submerged in 8 feet of water and some distance offshore. As the dam only adds 12 feet extra head to the river, which itself is a straight run of white water, there seems to be little possibility of the dam ever becoming essential for power purposes.

EXTRACTS FROM THE REPORT OF R. W. HAGGEN.

DATED DECEMBER 20TH, 1918.

[Mr. Haggen was employed in 1918 by the British Columbia Government in making surveys in the valleys of Baker, Narcosli, and Mackin Creeks in vicinity of Alexandria and Quesnel.]

The territory covered was the Fraser River Valley between Soda Creek and Kersley and the valleys of Mackin, Narcosli, and Baker Creeks, in addition to which two pre-emptions were surveyed at Goose Lake, on the Quesnel-Fort George Road. All the outlying lots in this section

were tied in, with one exception, and twenty-six pre-emptions surveyed; while data were gathered as to topography throughout the section, so that the new issue of the Quesnel Sheet of the pre-emptors' maps may be the more complete.

The first work undertaken was the survey of pre-emptions in the valley of Baker Creek, between 15 and 32 miles west of Quesnel. Three of these were taken up with the intention of farming rich bottom lands, while the others cover swampy areas which may, after drainage, be converted into hay meadows. On four of the places hay was cut this year, but I was disappointed in the quantity per acre; it is all sedge, but will doubtless fulfil the purpose of keeping stock alive during the winter. However, I should judge that it is necessary to cut at least 2 acres of hay per head of stock. The meadows as a rule do not lie along creeks, but around small lakes. When drained, it has been the experience in other parts of the country that such meadows cannot be depended upon. In wet seasons they will produce a good crop, while a dry spring, or light snowfall in winter, will result in a very slim crop. The past season was not favourable, and this doubtless accounts for the light crop. However, I think there is feed and range available for 300 head of cattle in the district near Puntchesakut and Puntataenkut Lakes.

There is considerable good range available for several miles up the valley of Merston Creek and the South Fork of Baker Creek, in pot-holes and in poplar, where peavine grows well. On some of the fire-killed areas there is a good growth of summer feed; others are barren.

On the bottom lands the cost of clearing would probably be \$40 to \$60 per acre. On these timothy grows well, and probably clover would yield a good crop. On account of the altitude and frequency of summer frost only hardy vegetables can be grown. Potatoes are grown for the use of the settlers, but they are, naturally, not of a marketable quality. Root-crops, cabbage, and cauliflower, however, grow well.

Most of the settlers have been on their places for several years and seem well pleased with their progress, though none could make a living off their pre-emptions alone until considerable more improvement has been made; in fact, most of the places contain so small an area of land that could be made productive that they never would support a family. However, each settler has some stock that is increasing and produces some revenue; he has a comfortable home, can live economically, and by means of trapping in the winter and working out in spare times he is enabled to make a comfortable living, and is probably better off than many a man in the cities. They at least have their living, and their stock would represent savings, apart from the value of the improvement of their holdings, which has a certain selling value. No doubt in a year or two there will be a school in the settlement. There is no post-office yet, but the places lie along the mail route from Quesnel to Nasko, where there is a monthly mail service.

The settlers tell me that they rarely feed their stock before Christmas, and turn out in April. In the winter there is rarely 2 feet of snow. I presume that the low temperature in winter would probably be about 60° below zero.

During the trapping season the settlers arrange among themselves for the feeding of their small bands of stock together. Each season the fur-catch contains a fair number of fox, chiefly cross, but some silver and black, which have a good selling value. The other fur is beaver, weasel, muskrat, and an occasional fisher or lynx.

The locality seems to be poor for game. There are few deer and grouse. In the fall there are quantities of ducks and geese. I also saw a rather rare sight in the district, a flock of pelicans. In the marshes around the lakes there are some of the despised "sand-hill cranes," which are really excellent to eat, though not easy to shoot. In Baker Creek and Puntataenkut Lake there are trout of various sizes.

About 25 miles to the west of this settlement, in the lower end of the Nazko Valley, there are some good herds of cattle.

VICINITY OF GOOSE LAKE.

On completion of the work in this locality I moved to Goose Lake, on the Fort George Road, and 25 miles from Quesnel. Here two pre-emptions were surveyed, one containing a portion of the meadow around Goose Lake and the other containing some meadow land along West Creek, the holder being absent on military duties. The first of these pre-emptions contains only a few acres of very poor meadow, and the balance of the land is of poor quality, but would afford some pasture. The place on West Creek contains the best land in this locality, but is not large. By clearing willows 40 acres of hay land might be utilized. Lying along a creek,

this meadow has not the drawback of meadows around the lakes. By damming the creek the ground can be flooded each year, then drained off so that it is dry in haying-time; thus a more reliable crop is secured. If worked to its capacity this place would probably carry thirty-five or forty head of stock. The climate, however, is rather more severe than that of the Baker Creek Valley, and undoubtedly there are severe summer frosts. Outside the hay meadow there is no agricultural land, the sides of the valley being rough and stony, with a dense growth of jack-pine.

There are plenty of beaver along this creek and the fur-bearing animals are doubtless to be found in the vicinity. It is 10 miles north of the Baker Creek Valley, but there is a high ridge between. There are ducks and geese on the lakes in the fall.

NEAR MOUTH OF NARCOSLI CREEK.

The next work was done on the west side of the Fraser River, between Higdon and Narcosli Creeks. Two of the parcels, the owners of which are overseas, are, I think, about the poorest pre-emptions I have ever seen, and I am at a loss to understand why they were ever recorded. One consists of a rocky hillside along the Quesnel-Alexandria Road, and the other of a swamp, that shows no sign of producing hay, on the summit of the plateau. Of the other parcels, one contains a little flat near the mouth of Narcosli Creek sufficient for a settler with other means of support to raise a garden and sufficient feed for his stable. He has raised excellent vegetables during the past season. The other parcels were on a bench above the road, 10 miles from Quesnel; they contain some good land, which is now covered with a growth of birch and cottonwood, which could be cleared at a cost of \$25 to \$40 per acre. A good spring provides domestic water. As a general rule this bench would, I think, be immune from summer frost, and good crops of roots and grain should grow without irrigation. From the nature of the vegetation I should judge that clover would also grow well. A rough road from the Quesnel-Alexandria Road runs through this land.

This locality has good access to Quesnel. The main road to Narcosli Creek is suitable for motoring, and the creek is only 14 miles from Quesnel. A steamer on the Fraser River provides freight and passenger service during the summer months. Quesnel is the post-office for the locality. There is no school. The benches along the Fraser suffer from an occasional summer frost, but generally crops do well. Irrigation is necessary for hay-crop, but not for grain. Generally speaking, the soil is a sandy loam, but there are patches of sand and gravel. There are some clumps of fir timber, but the vegetation generally consists of jack-pine and aspen.

The benches along the river here vary in width up to 1 mile; then a steep hillside rises to the plateau above. This plateau in general consists of rolling land, wooded with jack-pine, and somewhat stony; the soil is hard-pan to near the surface. There are scattered hay meadows small in extent; through the jack-pine the grass is generally of a poor feeding quality, but in open patches there is good range.

Messrs. Baker, Higdon, Wright, and Roddie are running cattle in this locality, probably 220 head altogether, and there would be summer feed for a larger number. Mixed farming is the industry to which the lands along the Fraser River are best adapted.

ALEXANDRIA, EAST SIDE OF FRASER RIVER.

Three pre-emptions were next surveyed in the vicinity of the Cariboo Road, in the Alexandria District, between 20 and 35 miles south of Quesnel. Two of these were owned by soldiers. The first lot lies in a draw about a mile from S. Hilborn's ranch, at the 201-Mile post, Cariboo Road. In this draw there is some very nice land, where the soil is a deep loam, the arable land being some 30 acres in extent. The vegetation consists of a rather dense growth of cottonwood and willow and would cost at least \$50 per acre to clear. There would also be considerable probability of summer frost. Root-crops and oats should grow, however.

Lot 9527, the next lot surveyed, is, I should say, useless as a pre-emption, though the settler probably thinks otherwise. It is hilly, dry, and wooded with fir which is not of good quality. There might be 500,000 feet of merchantable timber available on the whole area. There is fairly good range on the side-hills. The land lies to the south of Cuisson Creek and about 1½ miles up the hillside from the 190-Mile post, Cariboo Road.

The other pre-emption surveyed in this locality contains a fraction along the Fraser River, immediately south of the Alexandria Indian Reserve. There is some good land in the flats, but

it is dry, and without irrigation the crops raised are very poor. A portion is open and grassy; the balance is wooded with cottonwood, willow, and brush. Near the river a considerable portion has been hydraulicked and is in consequence of no agricultural value. This lot is near the 185-Mile post, Cariboo Road.

From Cuisson Creek, at the 190-Mile post, to this place there is a wide bench along the river, and it has been settled for years. Portion of the bench is owned by the Indians, and some under old pre-emptions, the owners of which are dead. Without irrigation the crops raised are very poor, and with such an excellent water-supply as Cuisson Creek available one cannot understand why irrigation systems were not constructed years ago. It is probable that sufficient water is available for the whole bench, as there are excellent storage-basins in the creek-valley, and the creek always has a good volume. Thirty years ago Chinese miners built ditches and dams and utilized the water. The ditches extend the full length of the bench. It is probable that lack of ambition and co-operation account for the state of affairs that has been allowed to exist. One man told me he "always had a good half-crop." In the seasons I have seen these crops I should say that through lack of proper farming methods the land has become so run out that it does not raise one-fifth of what it should. One field has been in oats each year for a quarter of a century and the crop this year did not yield more than 100 lb. of oats per acre, and these were mostly wild oats. Windt Bros., who recently purchased the old Cuisson Ranch at the mouth of the creek, are installing an irrigation system. The line of the Pacific Great Eastern Railway passes along this bench, and probably, when that line is complete, new owners will have the other ranches, and one may hope, in the future, that the "Alexandria Flats" will do their duty as they should.

UPPER NARCOSLI VALLEY.

I next surveyed two pre-emptions in the Narcosli Valley, about 8 miles west by road from the Alexandria Ferry, on the Fraser River. This creek runs through a fairly open, grassy valley, and along the creek there are some good flats on which timothy will grow well. In many places there is a dense growth of willow. There are a number of unsurveyed Indian allotments along the valley, and four white settlers have also located.

The valley is here at an altitude of some 2,500 feet. There is considerable summer frost, and the hay-crop is, I think, the only crop that would be reliable. The soil is a sandy loam and the flats along the creek are free of rocks. There is some range along the valley, where the cattle from the ranches near Alexandria feed. The Narcosli is a large creek, with three branches which rise some 20 miles from Alexis Creek. I have measured the stream in October, when it is probably at its lowest, and it then had a flow of 60 cubic feet per second. A portion of the water is now diverted to irrigate the Sunnyside Ranch at Alexandria. I hope to see the day when it will also be used to irrigate the benches between its mouth and Higdon Creek, and when the present system to Sunnyside Ranch will be enlarged to include a goodly portion of the benches on the west side of the Fraser Valley at Alexandria.

On the South and Middle Forks (Twan and Webster Creeks) there are some excellent hay meadows, from 10 to 80 acres in extent, on which a good crop of "sugar-cane" hay is cut; 250 head of cattle are now wintered on these meadows, in addition to horses.

I tied these lots to Lot 9494, Tingley Creek, which had previously been tied to surveys in the Fraser Valley. On this tie there are a couple of swamps that may possess possibilities as hay meadows. I am also informed that there are other meadows to be found in the district. This tie did not pass through any agricultural land.

The next tie was from the most southerly lot on Twan Creek to Lot 433, an old Crown-granted hay meadow which was not made use of for several years. Much discussion had arisen as to the creek on which this meadow lay, whether on Twan or a fork of Mackin Creek. It is actually on a branch of Tingley Creek. Several people have staked it during the past few years and various descriptions of its location were given. In these cases, with Gazette notices before me, I am reluctantly bound to conclude that the stakers were badly lost in the woods.

A road to this meadow leads by way of McRae's meadows to Riske Creek, some 36 miles distant. An old trail also leads to Twan's meadows, 5 miles, and another, which is almost undiscernible now, to Lot 102, Yorston's meadows, on Mackin Creek.

This meadow, on Lot 433, is now owned by P. D. McRae, a stockman of Riske Creek. I have seen few meadows which equal it in yield per acre. While the meadow is scarcely more than

80 acres in extent, the crop is nearly 120 tons. It has a good bottom and is easy to flood and drain.

At this time I was compelled to suspend the field-work for a month and pass the time in the unpleasant precincts of an isolation hospital; the "flu" germ was very active in Cariboo.

MOUTH OF HAWKS CREEK.

Upon resuming work I surveyed a pre-emption at the mouth of Hawks Creek, 3 miles below Soda Creek, and, incidentally, made a tie between lots along the Fraser River. The pre-emption contains about 25 acres of bench, which would be productive if irrigated. In its present condition grain and vegetables can be raised. The timber is fir, small in size, and there is some open bench. The cost of clearing the timber would be \$40 to \$50 per acre. There is a good road to Soda Creek. Along the river, on either side of this lot, the land is very rough and wooded with scrubby fir.

MELDRUM CREEK, NEAR CALLANAN LAKE.

Some outlying lots on Shell and Meldrum Creeks were next tied to the surveys at Callanan Lake, which had been tied previously to the Chilcotin township surveys. On Shell Creek there is no land that is of any value, with the exception of small meadows which were taken up a number of years ago.

The valley of Upper Meldrum Creek is generally rolling and wooded with jack-pine and poplar. There are numerous lakes, the largest being Callanan, Meldrum, Natsy, and Dester. The only land that is at all suitable for farming is on the shores of Callanan Lake, and that is not of very good quality.

The meadows along Meldrum Creek are also disappointing, the hay being of a very poor quality. However, it brings the stock through the winter.

The road from Riske Creek, 13 miles from Callanan Lake, to Mackin Creek follows the valley for some distance, and trails lead to Meldrum Creek Settlement, on the Soda Creek-Chilcotin Road.

MACKIN CREEK.

The last work of the season consisted in tying in some lots to Lots 102 and 109, Mackin Creek. Between Lots 109 and 9181 the country is swampy and of no value. Between Lots 102 and 242 there is a small meadow which has been staked as a lease; the balance is mostly rolling, stony, jack-pine country, with a few grassy pot-holes. Lot 242 appears to be a miserable meadow, and, so far as I know, it has never been utilized.

Along Mackin Creek there are some excellent meadows, held by Messrs. Yorston, Cotton, Arthur Bros., and Moon. About 1,800 head of cattle from the Chilcotin District are wintered on the meadows of Mackin and Meldrum Creeks; the Mackin Creek hay is of good quality.

MACKIN CREEK TO ALEXANDRIA.

Lots 102 and 103, Mackin Creek, were originally taken up by William Adams in connection with Sunnyside Ranch, Alexandria, and a road was built between the places. Until a few years ago this road was considerably travelled. This season, when returning to Quesnel, I came out over it, but it is badly covered with windfalls and will hardly be of use as even a trail now. In one place we spent three hours making a mile of headway, and only travelled 20 miles in ten hours.

The old Hudson Bay Trail from Narcosli Creek to Alexis Creek is also badly covered with fallen timber, and it is practically impossible to follow it now. As this trail provides an excellent short route from the Upper Chilcotin to Alexandria and the Fraser Valley, it is a pity that it is not kept open.

INDUSTRIES.

The chief industries of the Cariboo District at the present time are farming, stock-raising, and mining. The farming is chiefly confined to the Fraser River Valley. Excellent root-crops are grown and various grains. Wheat is milled at Soda Creek and local flour used throughout the greater part of the district. The vegetables will compare favourably with those raised in any part of the Province. Several of the farmers have good dairy cattle, and a fair proportion

of the butter used is made in the district. Most settlers have a few hogs and there are small flocks of sheep.

The stock-raising industry is the mainstay of the Chilcotin, Alkali, Lac la Hache, and 150-Mile House localities. Individual ranchers have herds varying in number up to as high as 1,700 head. In the fall the cattle are driven to the Pacific Great Eastern and Canadian Pacific Railways, at 59-Mile and Ashcroft respectively. This is a flourishing industry at the present time owing to the high price of beef.

Mining is at present confined to placer-grounds in the Barkerville and Horsefly, while one claim is operated at Cottonwood Canyon, on the Fraser River, 20 miles above Quesnel. However, the output this year is disappointing. Low values of platinum have also been found. Whether there is "pay" in the district will be found out in the future. Scheelite containing tungstic acid occurs at Hardscrabble, near Stanley. In the range to the east of the Fraser River there are several outcrops of copper which may be of value when the railway is completed. At Birrell Creek, Quesnel River, gold and platinum are being obtained. There is a large coal-body at Australian Creek. In addition to the foregoing, there are good deposits of diatomaceous earth, carbonate of lime, and clay, which may form the basis of some future industry. Kaolin is reputed to have been found near Sheep Creek, but I have not seen the samples.

GAME.

As the district is large, it contains many varieties of game and fur-bearing animals in the different localities. The big-game hunter can find much enjoyment in the Barkerville region, where the moose considers himself monarch; at least, one sees him frequently along the margins of the lakes and rivers, and he is the picture of open defiance, ready to fight when molested. The grizzly bear is also at home in this region and some splendid specimens have been obtained. On the hills caribou are numerous, and to the north-east one enters the mountainous country where the goat has elected to live. Of fur-bearing animals, marten, beaver, and lynx are the principal. In the Quesnel Valley and along the Fraser and west of the Fraser there are some deer. Fair catches of fur are made all over the district. On the large creeks and in Quesnel River there is excellent fishing.

EXTRACT FROM THE REPORT OF A. H. HOLLAND.

DATED NOVEMBER 12TH, 1919.

[Mr. Holland was employed in 1919 by the British Columbia Government in making surveys in the vicinity of Vanderhoof and Prince George.]

The work allotted me this season covered areas extending from Vanderhoof to a point 40 miles east of Prince George, and was through a country already settled and reported on during the last few years, so that any report I can make will be more or less of a duplication. The party was organized at Vanderhoof, which is the centre of a distributing-point for one of the best areas of agricultural land in the Province, and near it can be seen farms in all stages of development, from the settler who has just received his record and is living in his tent while clearing his home-site, to the home of the old-timer who came into the old country in 1906-1907, and now has his whole 160 acres under cultivation, raising wheat, oats, hay, and root-crops, and finding a ready market for all his produce.

The Government, through its Departments of Works and Education, has kept pace with the growth in this district, and its roads extend in all directions, and schools are established at all points where pupils can reach them. It is also proposed to erect a creamery and install a man to run it, and this is giving an impetus to dairying, which so many settlers wish to go in for, and a few of them sent one of their number down to the Lower Fraser Valley and brought in two car-loads of milch cows during July of this year.

Other settlers have gone in for sheep, and one man with a drove of 400 has done exceptionally well, summer feed being abundant everywhere, and he having sufficient cultivated land to raise winter feed. Vanderhoof has three large general stores where supplies of all kinds may be obtained, and one feature noticeable in our purchasing this year was that we were supplied with beef, butter, eggs, and vegetables of local production.

NORTH-EAST OF VANDERHOOF.

The first work started was in Township 21 of the Cariboo, which is about 14 miles north-east of the town and 3 miles north of Chilko Post-office, and can be reached by automobile over a good road. The country about here is all timbered with a growth of pine varying from 3 to 6 inches in diameter; but with the exception of one 40-acre tract, no milling-timber was found, though there is sufficient everywhere for domestic purposes. It drains north and east into the Stuart River, and there is a distinct difference in the soil, as we find considerably more gravel with the silt, but this is offset by the fact that water can be obtained nearly everywhere from comparatively shallow wells.

Throughout the surveys made here were found many wild-hay meadows of from 15 to 50 acres, and the existence of these has attracted some settlers, among whom are two who each have started with sixteen head of cattle and are putting up the slough-hay for winter feed.

These meadows are all that remain to show that at one time this was an ideal trapping-ground for beaver, and now experience has proved that these meadows will, when drained, raise heavy crops of timothy or the wild red-top and vetch, which are the wild fodder of the country, but as the winters are long and stock require from 3 to 4 tons per head to carry them through, it is not a range country; but it is very suitable for mixed farming, vegetables and small fruits thriving and oats maturing in spite of the summer frosts, which are still prevailing, but which will gradually disappear as more land is cleared and brought under cultivation.

An experiment such as is being tried in some of the other Provinces should be tried out in this district; that is, the burning-off of the growth of the small pine under expert supervision in order to improve wild feed of the district and reduce the cost to the settler of clearing his land.

Some areas through which we passed this summer have been fire-swept two years ago, and now have a splendid growth of vetch and lupine, but the disadvantage of an uncontrolled fire lies in one or two extremes—either the fire leaves a windfall which is impassable and prevents grazing, or it comes in midsummer when everything is dry as tinder and intense heat destroys the surface mould, thus retarding any growth until the land has been summer-fallowed and the lost elements returned.

One or two of the settlers whom I saw did their slashing in the winter and burned in the early spring, and as soon as the last snow has disappeared sowed timothy among the stumps, with the result that they had plenty of good pasture close at hand for their few head of stock. While we were in this part of the district there were a number of intending settlers from Southern Alberta looking for locations where cattle could be ranged, and one man brought in three car-loads of stock, including one registered stallion, and proceeded farther north to Stuart Lake.

VICINITY OF STUART RIVER.

Continuing our work north-easterly, we reached the Stuart River, where the Government has placed a pontoon ferry, thus giving the settlers on the east and north bank a good road connecting with the railway at Vanderhoof; it has also this summer built new roads from Chilko Post-office to the Nechako River, connecting by means of a ferry with the station at Hulatt and shortening the distance to the railway by 7 or 8 miles.

Some splendid farms were seen on the Stuart River flats, where evidently they are not troubled with summer frosts, as the root-crops were still green and the oats and hay-crops were in the barns when we were there. Our work here only lasted two days, and we proceeded back 25 miles to Vanderhoof over a good road on which automobiles had travelled during the season, and took the train east 40 miles to Isle Pierre, where one pre-emption, whose only production came from an illicit still, only delayed us a few days, and we moved by hand-car to Nichol Station and Post-office.

BEDNESTI LAKE AND VICINITY.

There is little or no bottom land along the Nechako near this point, and we moved back over a newly constructed wagon-road to the bench land, which is to the south and is about 300 feet above the river at an elevation of 2,400 feet. Here we camped on Bednesti Lake, one of the many pretty lakes of the district, which this year has been made accessible to the sports-

man of the Fort George District by means of a short wagon-road connecting with the main Fort George-Fraser Lake Road.

The Indian name Bednesti (meaning Fat Trout) is fully appreciated by any one spending a day there, whether with fly or troll, as many good catches are made, especially in the fall, when lake-trout up to 25 lb. in weight have been landed.

The country here is timbered with scrub, spruce, and pine, rather heavy clearing, and as there is a good deal of gravel with the silt it has not attracted many settlers, though to the south of the lake, where heavy fires have swept the country bare, there were some new settlers going in this year and taking up some wet hay meadows with the intention of running a few head of cattle.

From here we moved 7 miles east by wagon to Bednesti Prairie, where two returned soldiers have taken over two Crown-granted lots and intend going in for stock. They did not get on the land till July, but were able to plough some 35 acres by means of a tractor, and on September 20th were cutting the green oats for winter feed, and next year intend to erect a silo to handle any late crop.

They have experimented this summer with hogs, which have been allowed to run wild all summer, feeding on bracken and vetch and only returning to the piggeries at night, and the results have been so satisfactory, both in a monetary way and in their value at land-clearing, that they are increasing their drove.

The soil about here is all silt or clay loam, but whether because of its elevation or of its green timber, it is very subject to summer frosts.

SWEDE CREEK.

Five miles farther east on Swede Creek, which is closer to the Nechako River, some fine level land was surveyed, and here were seen the first fruits that to my knowledge have thrived in Cariboo north of Quesnel. Both this season and last, apples, cherries, and plums were grown and shown at Prince George Agricultural Show, where they took prizes, and there seems no reason to doubt in future years the growth of the hardier varieties of apples will become general.

On our next move from Swede Creek to Prince George we passed many good farms, whose buildings and crops denoted success not only on the light sandy flats west of the Chilako River, but in the river-bottom itself and on the high bench land to the east, where the soil is silt and heavy clay.

PRINCE GEORGE.

Prince George has become a very busy place in the last few years, and there is a steady growth of trade with the surrounding country, as the sawmills of the Upper Fraser Valley, as well as the farms of the Nechako, are all tributary to its business, and the location of a settlement area in this vicinity and the taking-over of a large tract of splendid agricultural land, upon which houses are to be erected and small clearings are to be made, will also be a boon. Its banks, stores, and hotels are all thriving and there is not a vacant house to be had in the town, and with the completion of the Pacific Great Eastern Railway, with its shorter connection with Vancouver and the Lower Coast, a fine country will be opened up.

NEWLANDS.

From Prince George we proceeded 30 miles east by rail to Newlands and inspected four old pre-emption holdings, but, as the timber is heavy and no attempt had been made to improve the land, no surveys were made. The land itself will make splendid farms when cleared, as the soil is a loam and well watered, but at the present the high cost of clearing makes it almost prohibitive, as some slashing alone cost \$45 per acre this year, and until some future day when there are small portable sawmills or pulp-mills established which will give the settler a market for his timber, as well as employment during the winter months, the settlement will be slow. The settlers already established and having land under cultivation are doing well with grain, hay, and vegetables, and one man with a large drove of hogs especially so.

This is also the centre of a fine hunting district, moose, deer, and black bear being numerous.

EXTRACT FROM THE REPORT OF W. G. MERSTON.

DATED NOVEMBER 17TH, 1919.

[Mr. Merston was employed in 1919 by the British Columbia Government in making surveys in the vicinity of the Nazko River.]

CHILCOTIN VALLEY.

Chilcotin Valley is well populated, with small settlements grouped around the numerous mail-distributing centres. The chief settlement in the valley is Alexis Creek, which boasts of a good general store kept by Tom Lee, a post and telegraph office kept by Mrs. Graham, an hospital under the charge of Dr. Wright, and a Royal North-west Mounted Police station. The principal occupation of the settlers is stock-raising, carried out on a large scale.

The home ranches scattered along the Chilcotin Valley grow good crops of hay, vegetables of all kinds, and small bush-fruit. Sheep and dairy cattle are kept for home consumption. Hay for winter feed from December to April is put up in large quantities on the home ranches and on wild-hay meadows in the surrounding country.

The soil in the vicinity is chiefly on dry bench land, and to be profitably worked requires irrigation. Most of the larger ranches have constructed irrigation-ditches, drawing water from the Chilcotin River.

The range around the valley appears to be overstocked and is held chiefly by ranch-owners operating on a large scale.

ALEXIS CREEK VALLEY.

Alexis Creek Valley is about 20 miles long and for the most part is narrow, with little soil. The few open flats and willow bottoms scattered at irregular intervals along the bottom have all been taken up and surveyed. The open flats are arid grazing lands, growing a fair quality of bunch-grass. The willow bottoms if cleared are capable of producing vegetables or hay.

Alexis Creek is a shallow sluggish stream, flowing over a gravel bottom. At its junction with the Chilcotin Valley it was found to be 12 feet wide and 4 inches deep (September).

A poor and rocky wagon-road runs along the west side of the valley. Some 20 miles from the Chilcotin Valley this road crosses an imperceptible divide. A large swamp at the head of the divide drains to the south by Alexis Creek, and to the north through a series of swamps and lakes to the Nazko River.

NAZKO LAKE VICINITY.

The country around the watershed is rolling and rocky, the soil having been burned away by successive bush fires. About 3 miles beyond the summit the wagon-road passes by Loomis and Goring's home ranch (N.W. $\frac{1}{4}$ Lot 4799). These two settlers have been in the country about ten years, raising cattle profitably. A large garden in front of their house grows good turnips, beets, carrots, and cabbages.

A couple of hundred yards before this ranch is reached there is a fork in the wagon-road. The left branch runs to the Nazko Indian Reserve by way of the Clisbako River. This road is little used and is much blocked by fallen timber. The road to the right runs to Martin's meadow (Lot 352) by way of Loomis and Goring's meadow (Lot 8702), a distance of approximately 22 miles. The whole of this road was cut and built entirely by the settlers in the country without any Government assistance.

The country for some miles on either side of the road is undulating and is mostly covered with rather stunted second-growth jack-pine. The soil is shallow and rocky. In the depressions are scattered small swamp-hay meadows. The majority of these are either too small or too wet to cut profitably. The few larger meadows have all been taken up and surveyed. They grow a good quality of swamp-grass, which, though not fattening, will keep the cattle alive during the winter.

Five miles from Loomis and Goring's home ranch (Lot 4709) a road branches to the left and runs north for a mile to Cooper's meadow. This was surveyed as Lot 6699. The pre-emption is productive and yields annually about 80 tons of good-quality swamp-hay. The wagon-road finishes at Martin's meadow (Lot 352) and is succeeded by an indifferent trail which runs down to the Nazko River at Lot 8703. The country between Martin's meadow and the Nazko River is valueless and is chiefly rock and stunted jack-pine.

NAZKO VALLEY.

Nazko River leaves the north end of Nazko Lake. Here it has a width of about 40 feet and is from 1 to 2 feet deep, flowing with a speed of about 3 miles an hour over a muddy bottom. From Nazko Lake to Lot 8703 the river runs through a narrow valley with steep, rocky side-hills. In places the valley widens and small lakes are formed. This piece of the river was not explored. From Lot 8703 north the valley widens out, leaving grassy flats approximately half a mile wide, through which the river winds. These flats in places are covered with willow and small poplar, but for the most part are open. The soil is dry and sandy with a gravel subsoil and grows good summer feed. In places where the soil is more moist wild hay and peavine thrive. The side-hills which border the valley become less steep and in places grow good grass for summer range.

A few cattle were seen grazing, but there appears to be range available for an additional 600 head or more. There are approximately 3,000 acres of unsurveyed land fit for pre-emption in the Nazko Valley. This land, in conjunction with wild-hay meadows to the east of the valley, is fit for settlers wishing to start in the cattle-raising business in a small way.

A good trail runs down the valley as far as the junction of the Clisbako River. From this point a wagon-road has been cut out to the Nazko Indian Reserve.

The country to the east of the Nazko was not explored, but several good hay meadows were reported.

From the junction of the Clisbako River north the valley has been surveyed. Several settlers, with their wives, have taken up land and are farming profitably. Good crops of timothy hay and oats were seen, and vegetables of all sorts were grown for home consumption. Potatoes were successfully grown on the east side of the valley. Those on the west side suffered from summer frost. The settlers in this part of the valley get all their supplies by way of Quesnel.

Wagon-roads run from the Nazko Indian Reserve to Quesnel, Blackwater, Baezaeko River, and up the Nazko Valley. The first two of these are good; the latter are poor and stony.

FISH LAKE VICINITY.

The country between the Nazko Valley and the Baezaeko, with the exception of a few scattered hay meadows, is valueless. The soil is thin and rocky, with scattered jack-pine.

About 11 miles from the Nazko Indian Reserve the road passes by Fish Lake. Indians from as far as Alexis Creek come here in September to put up fish for the winter. The trout, running as long as 18 inches, will not take a fly and were caught by the hundreds with nets and traps.

Between Fish Lake and the Baezaeko River, a distance of about 3 miles, are several good hay meadows, two of which were surveyed for pre-emptors. Others were occupied by Nazko Indians and are held by them under lease. This country, where the soil permits, will grow hardy vegetables, but not potatoes. From Fish Lake the wagon-road runs on to the Cluskus Indian Reserve. This was not explored.

GAME.

No game was seen until the Nazko River was reached. This river abounds in trout and whitefish. About forty trout were caught with fly each evening after supper. The average weight was about $\frac{1}{2}$ lb. Mallard ducks were plentiful and were very easy to get along the river. Grouse, both willow and Franklin, were scarce except in the Fish Lake locality, where they were plentiful. Geese were plentiful in the latter part of September, but were hard to get. No moose were shot, but our teamster reported seeing one swimming a small lake in the vicinity of Fish Lake.

EXTRACT FROM THE REPORT OF J. F. CAMPBELL.

DATED NOVEMBER 20TH, 1919.

[Mr. Campbell was employed in 1919 by the British Columbia Government in making surveys in the vicinity of Summit Lake and Salmon River and also on the Parsnip River.]

SUMMIT LAKE.

Summit Lake lies about 30 miles north from Prince George and on the northern slope of the Arctic watershed. The land bordering on the lake is heavily timbered, principally with fir and spruce, running in diameter from 8 to 36 inches. The timber extends back from the lake half

a mile to a mile. The land to the west of the lake is marshy and contains some good hay meadows.

There are eleven islands in the lake, varying in size from 1 to 60 acres. These I surveyed. A few of the islands contain good agricultural land, but the majority are very gravelly and fairly heavily timbered. To the north-east of the lake there is a certain amount of good land, interspersed with small hay meadows, that is ideal for mixed farming. Along the Giscome Road the country has a growth of light poplar and pine that can be easily cleared. Peavine and grass grow to a height of 18 inches.

Summit Lake gains its importance from the fact that it is the starting-point by canoe for the Finlay River and Peace River District west of the Peace River Block. Supplies for the posts of the Hudson's Bay Company at Fort McLeod and Fort Grahame and for settlers and independent trading-posts on the Parsnip, Peace, and Finlay Rivers leave this point.

Owing to the wonderful waterway leading into the north country there are generally a number of outfits at the lake preparing for the trip. A small boat-building plant is located at the eastern end of the lake, where pointers or small river-boats are built.

There are two roads to Summit Lake. One of these, known as the Giscome Portage Road, starts from near the head of Giscome Rapids on the Fraser River and joins the lake at its eastern end. This road is 8 miles in length. Heavy material for the Upper Peace River can be loaded on scows or canoes from the Grand Trunk Pacific Railway at Hansard or some other point on the Fraser River and floated down-stream to Giscome Portage and hauled across the road to the lake. A number of teams at Giscome are used for freighting purposes.

Another road, completed this fall, connects the lake with Prince George. This is an excellent road for light traffic and automobiles.

There is a store at Summit Lake and also one at the Fraser River end of the portage.

CROOKED RIVER.

Crooked River leaves the northern end of Summit Lake and flows in a northerly direction to McLeod Lake. What is called the Crooked is really a series of lakes and sloughs connected by the river. The largest of these lakes are Davie, Red Rock, and Kerry.

The Crooked is part of the main waterway into the northern country. This route is one of the most-travelled waterways for canoes and small boats in British Columbia, as most of the supplies for the extensive country to the north pass down it. Many trappers and prospectors for the Liard and Fort Nelson Rivers go by this route, for with the exception of a short portage in Sifton Pass canoes can be used the entire distance.

The river can be navigated the whole open season by loaded canoes and scows. Scows carrying 2,000 to 8,000 lb. can be taken down-river with very little trouble until the end of July. After that date the water usually drops, and for a couple of months, until the fall rains, the riffles in the river give trouble to boats too heavily loaded.

There are a number of riffles or chutes in the river that are shallow and the water very fast. Harrison Riffle, 8 miles from the Summit Lake, and Long Riffle, 18 miles from the lake, are the only two places on the river that require to be watched with care. The river between riffles is slack.

The land along the Crooked from Summit Lake to Kerry Lake is rather patchy and good agricultural land is scattered. From Kerry Lake to McLeod Lake the country becomes better from an agricultural point of view, but the valley is narrow. Most of the bottom land along the river is very good quality. The river-banks are covered with a dense growth of willow. This extends back for possibly 100 feet, while behind this screen are many large and fertile meadows. The river bottom or valley varies in width from a quarter to a mile. The river-bench is about 100 feet high and is gravelly and lightly timbered with pine and poplar. Good agricultural land lies back from the top of the bench at variable distances—in places half a mile, in other places 2 miles. The country is well watered, many large creeks flowing into the Crooked, especially from the east.

The snowfall in this area is exceptionally heavy. Although no record has been kept, a few years ago I saw a depth of 7 feet.

There is no settlement in this district. A few trappers are located along the river, but as these places are only occupied in the late fall and winter no cultivating has been done.

MCLEOD LAKE.

Both sides of McLeod Lake are timbered with spruce, pine, fir, and poplar. There is very little good agricultural land on the east side of the lake owing to the hills rising sharply to the divide of the Parsnip River. On the west side the timber is rather heavy. There are scattered patches of burn extending back from the lake that could easily be brought under cultivation. On both sides of the lake are flats of a few hundred acres that in time will make very good farms. As the northern end of the lake is approached, the country, especially to the west, becomes fairly level and the timber light poplar and willow. The soil is generally a sandy loam with gravel subsoil.

At the northern end of the lake is situated the store and trading-post of the Hudson's Bay Company. The post was located over a hundred years ago. Previously to the Hudson's Bay Company the North-west Fur Trading Company had made Fort McLeod one of its principal posts in the north. According to Mr. Hammet, now in charge of the Hudson's Bay post, the present site of Fort McLeod was the scene of a great battle between the two fur-trading companies, the Hudson's Bay Company winning and driving the rival traders from that part of the country.

Vegetables have been grown yearly for the past hundred years by the Hudson's Bay Company, and although the frost at times is heavy there has not as yet been a total failure of crop. Potatoes seem to be the main crop and stand favourable comparison with crops from other points in the Cariboo. George Holder, who has lived opposite the Hudson's Bay post for twenty-eight years, has a good-sized garden under cultivation. Potatoes, beans, and strawberries have generally been a success.

Below Fort McLeod, on the Pack River, timothy was sown a few years ago, and although the catch was not heavy the hay grew to a height of 3 feet with a very good head.

As there is no live stock in this part of the country, due to the difficulties of getting it in, grains have not been sown.

A good pack-trail goes from Fort St. James, on Stuart Lake, to Fort McLeod. A number of trails leave McLeod Lake, going through Pine Pass to the Peace River country. The best of these leaves the lake a short distance above the fort.

There are now three trading-posts at McLeod—the Hudson's Bay Company, Seebach & Huble, and Ivor Guest. The stock of supplies carried is very limited, being used principally for trading purposes. As supplies are naturally very low in the spring and summer, due to the heavy fur trade in winter, any one going into this country should take a full stock of provisions.

PACK RIVER.

Pack River leaves the northern end of McLeod Lake close to where the Hudson's Bay post is located. The river is navigable the whole of the open season for boats drawing up to 18 inches of water.

Six miles below McLeod the river widens into Tudyah Lake. The lake is about 3 miles in length. Ten miles below the lake the Pack River empties into the Parsnip River. A mile below Tudyah Lake the Cross Rapids on the Pack are encountered, this being the only bad water between McLeod and the forks of the Finlay and Parsnip.

The land along the Pack is patchy. At some points open burn and meadows are in evidence, while a short distance on exceptionally heavy timber is encountered.

From observation I would say that at one time the whole country was covered with a growth of heavy timber, mostly fir and spruce. Fires started by the Indians to obtain a supply of dry wood cleared out the country in patches that are now lightly timbered with poplar or else are small meadows. On most of the meadows very fine wild hay grows to a good height. The soil along the river is a sandy silt, subsoil gravel.

Three pre-emptions were surveyed on the Pack River below Tudyah Lake.

UPPER PARSNIP RIVER.

There is no large area of agricultural land in the valley of the Upper Parsnip. From the junction of the Pack, up-stream to within a few miles of Valley Creek, the country has been burnt over within the last fifteen years. The right bank is, however, still covered with a growth of green timber. From Valley Creek on the whole country is heavily timbered, principally with spruce, balsam, and fir up to 40 inches in diameter. Several very large creeks flow in from the

Rocky Mountain Ranges, but with the exception of those near the headwaters are not navigable for canoes, being very swift and full of log-jams. Above Tucheeda Creek, where the projected Pacific Great Eastern Railway crosses the Parsnip, the valley becomes very narrow, the spurs from the mountains coming down to the river. The river-flats are very narrow and covered with a growth of red willow. The upper benches are gravelly and rocky. From Tucheeda Creek on, the river is slack and it is possible to paddle to the foot of a large glacier at the source of the Parsnip. From the appearance of the vegetation the rainfall is very much heavier than on the lower reaches.

When the first explorers travelled up the Peace and Parsnip Rivers the mouth of the Pack was not noticed. The party passed the Pack and up the Parsnip to what is now called Portage Creek. This creek formed part of an important portage between the Arctic and Pacific watersheds. It flows out of a long narrow lake lying between high rocky bluffs. The old portage and water divide is at the head of this lake, being about half a mile long into another lake, the headwaters of the Bad River. The water parting is about 2,300 feet above sea-level. This river, the Bad, could furnish a large amount of water-power, as there are numerous falls that could easily be harnessed. There is a large amount of good spruce timber in this vicinity, but no agricultural land.

LOWER PARSNIP RIVER.

The valley of the Parsnip below the Pack widens out, being 2 to 3 miles in width. There is a large amount of land that could profitably be brought under cultivation. Starting 6 miles below the Pack River, the river-bench is half a mile in width and extends back to a bench about 100 feet high. The first bench or river-bottom is generally of excellent soil and carries a heavy growth of grass and wild hay. The second bench back from the river is also good soil and is half a mile in width. From there the land gradually rises to possibly 300 feet above the river, and the timber, though burnt, is still standing. On the first two benches at least two fires have swept over and the land is very free from windfall. A quarter of a mile can easily be seen across country. In places where the country is not burnt the timber is heavy, running to about 15,000 feet per acre.

The country along the Parsnip is patchy and agricultural land requires to be selected with care.

The river, though swift, can easily be navigated by the heaviest of scows and canoes, and possibly by light river-steamers. In time, if a railway is not built along the river, steamboats will be the mode of transportation, as there are hundreds of miles on the Finlay, Parsnip, and Peace Rivers that can be navigated by light boats.

LITTLE SALMON RIVER.

The surveys carried out in the Little Salmon River District consisted of subdividing lands reverted under the "Soldiers' Homestead Act" into 160-acre blocks; 13,260 acres were so subdivided.

The area known as the Little Salmon River District is nearly all burnt over. The burn extends from near the Nechako north to within a few miles of Summit Lake and west from the Fraser River. At least two large fires have gone over the country, the first sixty to seventy years ago. The country at that time was heavily timbered with spruce and fir. Large fir-stumps that have withstood the fires measure up to 60 inches in diameter.

A second fire sixteen years ago swept the country and not only destroyed most of the standing timber, but burnt the soil so badly that for miles in some areas, particularly on the ridges, the gravel subsoil is showing. In other places the top soil and leaf-mould is destroyed and the clay subsoil exposed. The majority of the land, however, is of excellent quality and very little clearing is required.

The Salmon River area is a rolling country with light sandy soil in the valleys or basins between the hills. The majority of the hills or ridges are very gravelly and practically useless for agricultural or stock purposes. Owing to these gravel ridges one section may be nearly all gravel, while the adjoining section in the basin has very good quality soil.

The growth is principally poplar up to 3 inches in diameter and small willow. The growth of this is very rapid; one year it may be slashed and in the spring, unless it is ploughed under, a new growth starts.

Owing to the country being burnt over many creeks have dried up or else only run part of the year. However, there should be no difficulty in obtaining a good supply of water from wells. Twenty to 40 feet would, I think, be the average depth to go to obtain water; on some of the very high benches the depth to go would be very much greater.

The soil where badly burnt has a tendency to bake, and it takes very careful farming and rebuilding of the soil to produce a good crop. The most satisfactory method used to bring the badly burnt land under cultivation is first to sow clover or peas; turn this under to supply the humus necessary, and use the methods employed in dry-farming to retain the moisture in the soil. This method only requires to be used where most of the top soil is destroyed and the clay or subsoil exposed. There is quite enough moisture obtained from rainfall to supply all needs, and very good crops are obtained where proper farming means are used.

Quite a large number of farms are in operation in this area, and the majority of them, especially this year, have produced very good crops. Timothy and oats seem to be the most successful. Timothy on a 10-acre field ran as high as $2\frac{1}{2}$ tons to the acre. A certain amount of barley was sown, and a farmer of thirty years' experience said it was the best crop he had ever seen. Vegetables do very well, the potato-crop being exceptionally good. A very noticeable feature in this country is the heavy growth of wild berries. In the old burns raspberries are very plentiful, growing to the size of the cultivated variety. Huckleberries and strawberries grow in great profusion and high-bush cranberries are noticed everywhere. A species of wild cherry grows on many of the hillsides, and although it is useless for commercial purposes it is an indication that possibly fruit-trees may be planted with success.

The snowfall varies in depth from possibly 2 feet near the Nechako River to 4 or 5 feet as the divide to the north is approached. The spring and fall rains are generally heavy and can always be depended upon.

To the north-west, between Great Beaver Lake and the Nation Lakes, there is a large amount of agricultural land that is very similar to the Little Salmon District, both as regards soil and timber.

The majority of the land subdivided is very good quality, but there is a considerable amount that is very gravelly, and intending settlers require to select their land with care. I cruised the land by quarter-sections as carefully as the time at my disposal allowed, and the description of the land is shown in detail in my monthly reports.

MINERAL.

There is very little mining activity in the areas above mentioned. On the Fraser River on the pre-emption of Oscar Eden about 8 miles above Giscome Rapids galena has been discovered. Two tunnels have been driven into the hill and samples obtained have been very good. Mr. Eden tells me that the assay runs as high as \$56 per ton. What is thought to be uranium has also been discovered on this property. An expert came from the East recently to inspect it, as uranium has not as yet been found in that formation. The result of the assay is not at present known.

A number of prospectors are located on the Nation River, a tributary of the Parsnip. Placer gold in small quantities has been discovered, but nothing to warrant any hopes of a big strike.

On the Parsnip River a few miles below the junction of the Pack there are outcroppings of coal, whether of commercial value remains to be seen.

Farther north on the headwaters of the Finlay and Liard Rivers a few prospectors are working. I was shown native copper and galena from this area, also quartz containing gold and silver running \$200 to the ton.

GAME AND FISH.

Moose are very plentiful in the Little Salmon and Fraser River areas. It is only within the last few years that moose have come into these districts in large numbers. A large number were seen this summer, especially in the swamps and muskegs. In one day as many as fifteen were noticed in swamp meadows.

On the Crooked and Parsnip Rivers no moose were seen, but plenty of deer and bears were in evidence. A few caribou were also seen.

The fishing from Summit Lake north cannot be surpassed in British Columbia. The species of fish caught included rainbow trout, Dolly Varden, and what I believe is wrongly called Arctic or Parsnip trout. Arctic trout were only caught in the waters of the Arctic slope and not

farther south than latitude 55° N. At one point on the Crooked River, called Livingstone Pool, two men in half an hour caught seventy fish, enough for the entire party for two meals. At another point a few miles below the pool 25 lb. of fish were caught in a few minutes.

The lakes are well stocked with trout; in fact, at any point on the lakes and rivers fish can be caught with the greatest of ease.

EXTRACTS FROM THE REPORT OF R. W. HAGGEN.

DATED DECEMBER 2ND, 1919.

[Mr. Haggen was employed in 1919 by the British Columbia Government in making surveys in the vicinity of Barkerville.]

From the Fraser River at Quesnel the Cariboo Road ascends over numerous benches, crossing the divide between the Quesnel and Cottonwood Valleys at the 13-Mile House at an elevation of some 1,400 feet above Quesnel, or approximately 3,000 feet above sea-level. The crossing of the Cottonwood River is 500 feet lower than this, and near the crossing is Cottonwood Post-office and the ranch of the John Boyd Estate, which supplies a considerable portion of the hay and meat used along the road.

From Cottonwood the road follows the valley of the Cottonwood River 4 miles to Coldspring Ranch; here the stream forks, the southerly branch being known as Swift River and the easterly one as Lightning Creek. From the confluence of these two streams till it joins the Fraser River some 20 miles above Quesnel the river is known as "Cottonwood."

The Swift River Valley does not rightly come within the scope of this report, but it may be mentioned that a considerable area of land there was taken up under purchase some years ago. There are also reputed to be some hay meadows on tributary creeks. It is from Swift River that water is diverted and conveyed by a large ditch with siphons and flumes to Birrell Creek, in Quesnel Valley; this conduit having cost over \$1,000,000 to build. Swift River, while carrying some gold values, has never been a large producer. Drilling was done this year to ascertain whether it carried good enough values to warrant the installation of a dredge.

From Coldspring Ranch the Cariboo Road, along which traverse was carried, follows, generally, the valley of Lightning Creek, ascending, however, on to a high bench about 500 feet above the creek. The road runs near the edge of the bench, and here, at "Lover's Leap," a splendid view is obtained of the valley of Lightning Creek and the mountainous country to the south. Below "Lover's Leap" lies the old Bonanza claim, which has worked intermittently, with varying luck, for the last half-century.

WINGDAM.

At Wingdam, 6 miles from Coldspring and 30 from Quesnel, the road again descends to the creek-level. Here is a well-equipped mining camp operated by the Lightning Creek Gold Gravels and Dredging Company, the head office of which is in New York. This company controls some 20 miles of creek leases and has worked for a number of years, but is not yet brought to the producing stage. Some years ago a shaft was sunk, but slum in the workings necessitated its abandonment. Since that time considerable drilling has been done, and now a new shaft is being sunk about 600 yards up-stream. The bed-rock is at considerable depth below the surface.

At Wingdam there is a very rich garden-patch in the valley, and it seems to enjoy immunity from summer frost, which is a great detriment at Cottonwood and Coldspring. I have seen potatoes green at Wingdam when they have been blackened in the Fraser Valley.

For 10 miles above Wingdam the road follows through the narrow valley of Lightning Creek; there are no houses, no agricultural land, and no mining. The "Wingdam" leases extend here, but the development is being done at the lower portion of the property.

At Beaver Pass, 38 miles from Quesnel, H. J. Gardner has a good-sized ranch, producing a goodly quantity of hay and running a fairly large flock of sheep and some cattle.

VAN WINKLE AND RICHFIELD.

The original road to Barkerville followed up the valley of Lightning Creek, the old town-site of Van Winkle being about a mile above the present village. I endeavoured to tie in this old townsite; however, the only evidence I could find was the top of an old building. About

15 feet of tailings has accumulated over the old townsite. Above this old town the road ascended Burns Mountain, passing Ella Lake, and descending a long, steep hill into Richfield, a mile above Barkerville, on Williams Creek. It is no uncommon occurrence for the snow to lie on this old road until the end of July.

The present road, built a number of years ago, leaves Lightning Creek at Stanley, ascending the valley of Chisholm Creek; thence descending through Devil's Canyon to Slough Creek, a tributary of Willow River. The canyon has high, precipitous walls and is generally blocked with snow till June 10th. During the past season I had occasion to go to Barkerville on June 1st; there was then 2 feet of snow in the canyon, though other points on the road were clear. A bush fire some years ago destroyed the timber on the mountain-side, and snowslides are of frequent occurrence, while drifts at times make the road impassable. During the winter the road is kept open by means of a snow-roller and by shovelling out accumulations of snow in the canyon. Stanley to Slough Creek is 4 miles.

At Slough Creek mining was prosecuted for several years, but the ground was deep and wet and the expenses of handling the ground were too great to make the venture profitable. At Burns Creek, about a mile from the foot of the canyon, considerable work was also done.

JACK OF CLUBS LAKE.

From the foot of Devil's Canyon the road follows on the south side of Slough Creek for a couple of miles, then ascends a ridge, falling again to Jack of Clubs Lake, which fills the deep valley for a distance of $2\frac{1}{2}$ miles. The hillsides are burned off to a great extent and their barrenness detracts from the natural beauty of the valley at this point.

Jack of Clubs Creek enters at the western end of the lake. This creek has in the past been a good producer and is now being worked in a search for a continuation of the gold leads.

WILLIAMS CREEK.

From Jack of Clubs Lake to Barkerville, 4 miles, the road follows the valley of Williams Creek, the greatest producer of them all in the early days. There are a few swamp meadows along the creek, but all combined would not likely produce over 50 tons of poor-quality hay in a season.

Two miles from Barkerville are the old reduction-works built over twenty years ago, but now closed down. The valley-bottom from here to Barkerville is a wide bed of tailings, testimony to the vast yardage of gravel that has been washed out from the gulches and hillsides. In the middle of these tailings is still to be seen an old gravel-elevator of large proportions, now half-buried. The valley here swings in a semicircle, the road bending from north-east to south-west, passing the old cemetery, where the inscriptions on tombstones tell of the end of men from all corners of the globe and bear mute evidence of epidemics that visited the camp.

BARKERVILLE.

Half a mile from the cemetery lies the town of Barkerville, a number of old buildings straggling along either side of a curved street, a steep hill rising to the right; the street runs on tailings, and behind the town is a high bulk-head which protects the town from the tailings of Stouts Gulch and Williams Creek. Barkerville boasts three hotels, two good stores, a hospital, Government office, post and telegraph office, a branch of the Yukon Telegraph Line, and a school. The white population is probably 150. There is a Chinatown, but its population is now small. Originally there were several towns on the diggings—Carnarvon, on Stouts Gulch; Richfield, Barkerville, and Camerontown, on Williams Creek; Antler Town, on Antler Creek; and a town on Grouse Creek. Of Camerontown, Richfield, and Carnarvon I was unable to find any trace whatever.

In the sixties the combined population of these places was about 7,000. Williams Creek yielded, on the average, about \$1,000 per foot on bed-rock; Grouse Creek was second to it, with Lightning Creek a close third.

During the past season the Waverley Company has renewed its water system and hydraulicked this summer, at present washing out ground to provide dump-space for tailings from the mine. C. W. Moore is in charge of the work.

Two pre-emptions, one on the Bowron Lake Road and one at Kibbee Lake, 3 miles from Bowron Lake, were surveyed. At this time it became impossible to get men; man after man

was engaged, only to fail to come to work. The Mining Corporation of Canada, working on Proserpine Mountain, was offering steady work for the winter to all the men they could get. The residents of the Bowron Lake locality were in demand as guides to big-game hunters, a number of whom visit the district each fall. As a consequence it became impossible to keep the work going without incurring unwarranted expense and delay.

I made a traverse from Barkerville to Kibbee Lake, tying in a number of surveys made in the vicinity of Bowron Lake, thus enabling a complete map to be made of this locality.

BARKERVILLE TO BOWRON LAKE.

From a point a mile below Barkerville the Bowron Lake Road, originally intended as a road from Barkerville to the South Fork of the Fraser River, leaves the Cariboo Road, crossing Williams Creek, and running in a northerly direction through Little Valley, 8-Mile Creek, and Antler Creek Valley, the last-named creek draining into Bowron Lake, 18 miles from Barkerville. Between Bowron Lake and Barkerville there is only one place that can make any pretence at being agricultural land, this being a swampy meadow 14 miles from Barkerville, on which W. E. Brown has a pre-emption. The balance of the land is hilly, generally stony, and heavily wooded with timber of poor quality.

BOWRON LAKE.

Bowron River leaves the lake in a valley about a mile wide in places, gradually narrowing. Its elevation is 1,200 feet lower than Barkerville, or 3,100 feet. In several places there are benches on which the soil is good, a sandy loam, and the clearing fairly easy. There are also small natural-hay meadows in places along the river. Several settlers have had places near the lake for some years, raising, however, little more than is necessary for their needs. None of them have cattle, but all have some horses. It is doubtful if any of these places would enable a man to make a living from agricultural pursuits. The settlers are all trappers and guides, and make from all sources a comfortable living.

From Bowron Lake the road extends down Bowron River for about 8 miles; thence there is a trail for about 30 miles. The Fraser River Road was discontinued about 2 miles from the lake, in the valley of Kibbee Creek, and a trail extends to the Fraser. This trail is not now passable for horses, corduroy across swamp having floated out and rotted, and numerous windfalls having blocked the path.

GAME.

Bowron Lake is the centre of one of the best big-game districts in the Province. From this point canoes and small motor-boats can be taken to Swamp River, the North Fork of the Quesnel, and through Swan, Isaacs, and Spectacle Lakes, only short portages being necessary. Moose are abundant, and I have seen the small meadows so trampled as to give the impression that a hundred head of cattle had pastured on them. The hunter who is after meat will have little difficulty in filling his larder. Of course, if a hunter is seeking a moose with a good head, he may not meet with success very easily, as a good spread seems to be rare among the moose of this district. Bear are plentiful, both grizzlies and blacks being found. Of the fur-bearing animals, good catches of marten and beaver have been made, while mink and fisher are occasionally caught.

Before concluding the report on this locality I desire to express my appreciation of the kindness of Messrs. Hopp and Bailey in placing their maps at my disposal and assisting in locating corners of the old claims. Some of these maps were made when traces of old posts, now obliterated, remained, and these were tied to existing points.

QUESNEL FORKS.

Quesnel Forks, a deserted village, lies at the junction of the North and South Forks of Quesnel River. The hills are high and steep, but the soil on the bottoms is of good quality, and good crops can be grown without irrigation. Grain, vegetables, and hay do well. Clearing is expensive, costing about \$100 per acre. There is a limited local market for produce, chiefly at Keithley, where one mine is being worked by R. W. Harrison. Several trappers make Quesnel Forks, or the dam at Quesnel Lake, 7 miles distant, their headquarters.

EXTRACT FROM THE REPORT OF W. C. MERSTON.

DATED OCTOBER 20TH, 1920.

[Mr. Merston was employed in 1920 by the British Columbia Government in making surveys in the Nazko and Chilcotin Valleys.]

THE HEADWATERS OF BAKER CREEK.

About 25 miles from Quesnel, on the Nazko Wagon-road, a branch road forks to the south, passes by Quandstrom's pre-emption (Lot 9506), and runs to Tibble's Pre-emption (Lot 9511). From the south-east corner of the latter lot I commenced my season's work.

The country between Tibble's pre-emption and the headwaters of Baker Creek consists of a plateau some 12 miles long by 8 or 9 miles wide. This plateau is bounded on the east by a range of hills running back from and parallel with the Fraser River; on the west by the main hills of the Nazko Divide, rising to an elevation of approximately 7,000 feet; on the south by undulating hills which divide the headwaters of Baker Creek from the headwaters of Narcosli Creek. Three main tributaries run in a northerly direction through this plateau, and are locally called: South Creek, which is the main South Fork of Baker Creek, rising a few miles from the headwaters of Narcosli Creek; Middle Creek, which runs through the centre of the plateau and heads from a large lake marked on the maps as Tzenxaicut Lake; and Mountain Creek, which runs along the eastern edge of the plateau. This creek is not as large as either Middle or South Creek.

The valley of South Creek is in most places narrow. To the west pine-covered hills rise steeply and run back to the main Nazko Divide. To the east the hills rise steeply to a low divide between South and Middle Creeks. In places the valley widens, leaving natural wild-hay meadows through which runs the creek. Two quarter-sections were surveyed in this valley. Further work was made impossible by the high water which prevails in June. Ten miles below Tibble's pre-emption the South Fork turns to the west, running in this direction some 5 miles before again turning to the south. Running down South Creek is an old Indian trail, in many places very difficult to follow. This trail follows South Creek to its headwaters; then crosses a low divide to the headwaters of Narcosli Creek and runs on to Alexandria. Along the trail are numerous hay meadows which at present have not been taken up or surveyed. Altogether about 750 acres of open swamp-hay meadows were found along this trail. The best of these were on the headwaters of Narcosli Creek.

BAEZAeko VALLEY.

On completing my work around Baker Creek I moved to the Nazko, and then on to the Baezaeko Valley, where I surveyed a pre-emption belonging to A. McKenzie. Around the junction of the Coglistico and Baezaeko are several good hay meadows which at present are occupied by Nazko Indians, who have erected some miles of fencing and have put up log cabins. Any white man attempting to take up these lands would receive considerable hostile treatment from the present Indian squatters.

The Baezaeko at its junction with the Coglistico is about 150 feet wide, and in July had an average depth of $2\frac{1}{2}$ feet. The river flows at about 6 miles an hour over a hard pebble bottom. From the junction of the Coglistico down, the Baezaeko runs for about 10 miles through a barren valley which is useless for any sort of agriculture. Some 4 miles before the Baezaeko enters the Blackwater the valley widens, leaving some large tracts of level land on either side of the river. Some of this has been used by Joe Spiers, a settler lower down the Blackwater. He has erected fences and has built a wagon-road from the Nazko to a cabin he has erected on the Baezaeko. He is waiting for the land to be surveyed to make application for a pre-emption record. Two good quarter-sections could be surveyed here. The soil is a rich brown loam, at present growing peavine and wild timothy. Spiers has cut hay here for the last few years for winter feed for his stock.

The Baezaeko River above the Coglistico runs through a flat about 2 miles long by half a mile wide, the greater portion of which is held under Indian Lense No. 175. Above this the river runs through a barren country and no land fit for agriculture was found.

COGLISTICO VALLEY.

A tie-line was run from the Baezaeko Valley, following the Kluskus Sleigh-road up the Coglistico Valley to the 124th meridian, some 10 miles distant. The valley throughout this distance is narrow; the sides slope up steeply and are heavily covered with small jack-pine. No horse-feed was found between the Baezaeko Valley and a small meadow lying at the 124th meridian, and this piece of country is valueless for agriculture.

RED RIVER VALLEY.

From the junction of the Baezaeko and the Coglistico a trail runs to Lot 6715 (McKenzie's pre-emption). It follows through the meadow on this pre-emption; then crosses a low divide to Red River Lake, about half a mile away. This lake is about $1\frac{1}{2}$ miles long by $\frac{3}{4}$ mile wide and is extensively used by the Indians for fishing. Running out of the east end is Red Creek, which flows into the Nazko. A good trail follows down the creek and about half a mile from the lake passes through a good natural-hay meadow which has not been surveyed. A good quarter-section could be put in here. Some 3 miles farther down the creek passes through more open land, where another good quarter-section could be surveyed. The valley here is wide and to the north the side-hills are open and grow good feed, chiefly wormwood. Cattle from the Nazko come up into this valley for the spring feed.

A 3-foot seam of soft bituminous coal crops out on the side-hill here and is used by the settlers for blacksmith-work and heating. There is also a small outcrop of iron ore, which stains most of the country and colours the water of Red Creek a ruddy brown.

NAZKO VALLEY.

On completion of my work in the Baezaeko country my party moved back to the Nazko and surveyed 1,620 acres of hay and grazing lands into quarter-sections. The Nazko Valley, in which these surveys were made, was described in detail in my report of last year (*see* Annual Report Minister of Lands, 1919). From Lot 6718 a tie-line was run to a meadow taken up by Mrs. Wentworth some 5 miles to the east of the Nazko Valley. An old wagon-road was found leading to this pre-emption. It was much blocked by deadfall and took us two days to cut out. This pre-emption was surveyed as Lot 6720. The country to the east was explored as far as the Nazko-Baker Creek Divide and several open tracts were seen from the hills. These on closer examination all proved to be large muskegs and of no use for agriculture. It would be an easy matter to construct a wagon-road from Mrs. Wentworth's pre-emption through to the headwaters of Baker Creek, thus linking up the hay meadows of the headwaters of Baker Creek District with the good spring and summer grazing lands of the Nazko Valley.

The country between Mrs. Wentworth's pre-emption and the hills of the Baker Creek Divide is undulating and is covered with small jack-pine, through which are scattered many large open swamps and muskegs. This area is quite valueless, as the soil has been burned away by numerous bush fires, leaving a rocky surface with practically no soil.

On completion of the survey of Lot 6720 my party returned to the Nazko Valley. A new wagon-road has been cut up the valley to Lot 6720, and I continued this road some 6 miles to the foot of a lake known locally as Nazko Lake. This is not the same Nazko Lake as is shown on the maps, the latter being at the headwaters of the Nazko River. From the end of the wagon-road we built a raft and moved to the top end of the lake, where we completed our surveys in the valley. In places this lake is very shallow with a hard bottom, and good progress was made by hitching our team of horses to the raft and towing it up the lake.

At Lot 3431 a wagon-road branches to the east and runs down to Christie's pre-emption (Lot 3435). The Christie Bros. have cut out a road from here in a north-easterly direction for about 10 miles to a large hay meadow, where they have erected a log house and have put in numerous improvements. This meadow is approximately 4 miles from the Nazko Valley. The Christies are waiting for this piece to be surveyed in order to take it up. Along the 10 miles of wagon-road that they have built are several smaller hay meadows; in all, approximately 600 acres well worth surveying. The country as a whole is valueless, excepting for the hay meadows which are scattered between the low-lying jack-pine-covered ridges.

On leaving the Christies' place (Lot 3435) the Chilcotin Road crosses a flat for about a mile and then commences to climb the hills of the Nazko-Chilcotin Divide. The road winds through a natural pass and at no place is the grade excessive. Four miles from the commence-

ment of the climb the summit is reached at an elevation of approximately 5,000 feet. Beyond the summit the road falls steeply, and at a distance of about 3 miles passes through some good hay meadows which have been surveyed as Lot 4756. Here a wagon-road forks; one branch to the left passes by Loomis and Goring's pre-emption (Lot 4799) and continues to Alexis Creek; the other forks to the right and runs to Chezacut. This road passes through some miles of open flat hay land which has all been taken up and on which settlers put up many tons of hay each year. Four days were spent in the Chezacut country running tie-lines between existing surveys.

PUNTZI LAKE COUNTRY.

On completion of this work I moved to Puntzi Lake, where I commenced running a tie-line east connecting previous surveys. A valley runs from Puntzi Lake in a north-easterly direction for a distance of about 10 miles to a large plateau which runs back to the foot-hills of the Atchi Mountains. This plateau is fairly level. Low jack-pine-covered ridges divide the numerous creeks which flow from the foot-hills and eventually drain into the Chilcotin River. Along many of these creeks are good hay meadows, all of which are cut each year by the Redstone Indians, who have done much work in this part of the country and rather consider it as their own. The majority of the meadows have been fenced and cabins erected by the Indians. The plateau, which lies at an elevation of approximately 3,500 feet above sea-level, is valueless, excepting for its hay meadows. The only timber seen was small 3- to 4-inch jack-pine and a small quantity of 9- to 12-inch bull-pine.

This country is honeycombed with good Indian-built wagon-roads. All the meadows are connected and roads have been built down the creeks to Chezacut and Puntzi Lakes. Another good wagon-road connects Chezacut and Puntzi Lakes and runs to the main road near the Redstone Indian Reserve. Outside the Indians there is only one settler in this country, a German, who lives on Lot 261.

Many cattle were seen grazing on the open flats, chiefly Indian, with a few owned by white people. The difficulty of cattle-raising here appears to be that the country is so large that it is very difficult to round up the beef when they are required. While I was in this country several Indians were met who had been hunting their cattle and horses for some days without success.

No game were seen on this plateau, chiefly owing to the number of Indians who shoot both in and out of season.

EXTRACTS FROM THE REPORT OF R. W. HAGGEN.

DATED NOVEMBER 14TH, 1920.

[Mr. Haggen was employed in 1920 by the British Columbia Government in making surveys in the vicinity of Quesnel and Cariboo Lakes.]

For a number of years I have heard tales of the great timber wealth of Quesnel Lake, and from the number of limits staked there some fifteen years ago one would naturally assume there must be a splendid body of virgin timber. It was a decided disappointment to find this was not the case. Looking at the hillsides from the lake, one sees a dense forest of cedar, spruce, and hemlock, the trees ranging from 18 inches to 4 feet in diameter, so that, from a casual glance, a cruise of from 10,000 to 20,000 feet per acre might reasonably be anticipated. Upon closer inspection it is seen that the tops of the trees, especially the cedar, are dead; and it is strange, but nevertheless true, that practically all the timber is hollow along the entire length of the lake. I do not think that any of the cedar is suitable for logging, as the shell is rarely over 6 inches thick; while a dry-rot appears to develop in the heart of the spruce and hemlock. Whatever timber is available will be of the latter varieties, with patches of fir. I would not care to hazard a guess as to what merchantable timber there is in the aggregate along the lake. The cruise per acre would nowhere be high, though, and it is doubtful whether, with the amount of cull existing, logging could be carried out profitably. I do not know what is the cause for this peculiar condition; it can hardly result from insufficient rainfall or from climatic conditions—the altitude of the lake is only 2,250 feet; possibly some necessary ingredient is lacking in the soil. A botanist might be able to deduce the cause; unfortunately the effect is beyond human remedy. This condition seems to be quite local, confined to Quesnel and Horsetly Lakes, as the timber on the Clearwater slope, and also on Cariboo Lake, is of good quality.

The shores of Quesnel Lake are everywhere hilly, the mountains rising only a few hundred feet at the westerly end; on the North Arm they rise to an altitude of about 7,000 feet, while on the East Arm they attain in the Clearwater Mountains an altitude of 8,500 feet, the summits being snow-capped and a few small glaciers being visible. The mountain scenery at the head of both the North and East Arms is beautiful, though it has not the rugged grandeur of the Rockies; the Clearwater Mountains compare with the Gold Range in altitudes and general appearance.

There is no agricultural land along the lake above Horsefly Bay, though the few trappers who live there have nice garden-patches in pockets of rich loam. During the past few seasons splendid catches of fur, chiefly marten and beaver, have been made. The prevailing high prices of marten have enabled these men to live comfortably. Trapping is the sole means of livelihood, as, although considerable prospecting has been done at different times, no mines have as yet been discovered. Considerable work has been done on one property on Big River, a tributary of the Clearwater, but it has not been proved. So far as I have been able to see, the prospecting done heretofore has been rather haphazard and insufficient to afford any knowledge as to whether the country is mineralized.

There are two water-powers available along the lake; the best of these would be developed from the dam across the outlet of the lake. Niagara River, near the head of the East Arm, has a flow of 1,000 cubic feet per second, and at the edge of the lake has a fall of 130 feet. This waterfall comes over the upper portion of the rock wall in one body, then divides into five streams, and is indeed a pretty picture. However, as a practicable water-power it is too remote to be of value. There are also smaller powers available on Roaring River, Grain Creek, and Skookumchuck Creek, on the North Arm.

As a pleasure resort the lake is spoiled to a considerable extent by having a dam across the outlet; the gates in this dam are of insufficient size to carry the high water, and as a consequence the lake-water extends into the timber along the shores for a considerable portion of the summer, covering the beaches and continually washing away the soil from the roots of the trees, these falling and lining the shores of the lake. In the fall, when the water drops, there are some nice beaches along the main lake and the North Arm. The East Arm is more precipitous, the sides of the lake being steep and rocky, with few places at which it is practicable to land a boat in stormy weather; and for a surveyor making a triangulation survey a very difficult place to get stations. It was sometimes necessary to take the stations not where most desirable, but in any place where it was possible to land and set an instrument.

The East Arm is a bugbear to most people who have travelled the lake. Until this year none of the trappers had boats that were suitable for lake-work, and the lake is inclined to be stormy at all seasons. On the East Arm there is nearly always a wind sweeping through the gaps in the mountains, and terrific storms will develop in a few minutes, giving no time to reach shelter; the precipitous shores sometimes afford no landing-place for several miles, and it is not to be wondered at that those who know the lake best are always in a hurry to get through that portion lying between Hurricane Point and Niagara. However, with a good boat there is no occasion for getting into difficulties.

Quesnel Dam is renowned as a fishing resort and several well-known people come there each year after the trout. In the lake itself there are plenty of fish, varying in weight from 2 to 30 lb. There are a few bear, deer, and moose, but it is not a game-hunter's paradise.

Quesnel Lake is accessible from the 150-Mile House or Williams Lake, or Quesnel, by road, and cars can be taken to the dam. There are four motor-boats on the lake now. From the head of the East Arm a good trail leads to Upper Clearwater Lake, 6 miles away. There is only a low pass, about 200 feet in height above Quesnel Lake, between the two lakes.

Considerable areas of forest have been destroyed by fire; after every thunder-storm some fires start and the accumulated burns are now of considerable area.

KEITHLEY CREEK, CARIBOO LAKE.

Keithley Creek, the original "rich diggings" of the Cariboo, lies 17 miles from Quesnel Forks, on Cariboo Lake. I traversed the road from the existing surveys to Keithley Creek, and also traversed Cariboo Lake sufficiently to plot it. As is usual in this locality, there is very little arable land, the country being mountainous, and the only land suitable for crop production being on the old wash at the mouths of the creeks. The largest of these deltas is that at the

mouth of Keithley Creek, where Robert Borland, a pioneer of 1861, himself conducts a store and ranch. He raises some 30 tons of hay annually and always has a good crop of vegetables, Keithley potatoes being famed locally for their excellence, and this in a district that declines to take second place to Ashcroft as a producer of mealy tubers. Vegetables grow well on the Borland Ranch. Frank Hunter, a returned soldier, has a place at the mouth of Goose Creek, across Cariboo Lake from Keithley Creek, where he also raises a good garden crop. One drawback to farming in this section, however, is the high cost of clearing land; the growth is very thick, large spruce-trees rising from a tangle of alder and red willow, while there is a very limited local market for produce. At the present time, with the Kitchener Mine doing considerable construction-work, there is a brisk demand, but ordinarily the market is limited indeed.

From Quesnel Forks the Keithley Road, really a widened trail only, follows the North Fork of Quesnel River, of which Cariboo Lake is a widening. There is a nice-looking body of timber, consisting of cedar, spruce, fir, and hemlock, on the south side of the river, this extending into Coquette Pass and on to the mountain between the North and South Forks. There is also good timber on Cariboo Lake and, I am informed, along the river above the lake. It seems to be of good quality, the trees where cut being generally solid; there would not be the high percentage of cull in this section that there would be on Quesnel Lake.

The natural outlet for this timber would be via the Quesnel River to Quesnel, on the Pacific Great Eastern, and 65 miles distant. At the present time the question of necessary river-improvement for driving logs is being investigated.

A few years ago some pre-emptors staked swamp meadows at the head of Cariboo Lake. However, these were never occupied, and I do not consider that they are suitable for settlement, owing to the long duration of flood, lack of accessibility, and impracticability of draining them for cutting hay. They are very boggy and the sedge-grass on them is of very poor quality. I did not feel justified in surveying these as lands suitable for settlement.

Climatically, Cariboo Lake has much heavier precipitation than Quesnel Lake or the Quesnel Valley, the snow being deep every winter and usually lying for over five months.

Cariboo Lake and the North Fork of Quesnel River are good places for big game, moose and caribou being very plentiful. The former are easily hunted with boats, while the caribou are usually high on the hills. Beaver appear to be numerous. I do not know how the fur-catches have been latterly, but marten would in all probability be quite plentiful. Bear and moose are frequently in the field at Mr. Borland's; in fact, one moose made the ranch her home this spring and summer. The moose is as tame as the domestic cow during a considerable portion of the year, and about as interesting to hunt. The photographer will be able to get some genuine sport and some very interesting big-game pictures in this locality or at Bowron Lake, near Barkerville.

Cariboo Lake is very poor for fish. There are falls on the river that seem to be impassable and prevent them reaching the lake.

The mountains around Keithley Creek extend to an altitude of about 7,000 feet, the summits being above timber-line and generally rounded and easy to travel. There is a post-office, with a weekly mail service, at Keithley Creek.

MAUD AND VICTORIA CREEKS.

Some 12 to 15 miles along the water-conduit from Swift River to Hydraulic there are numerous patches of open hillside where the soil is a rich loam; these hillsides facing to Chiaz, Maud, and Victoria Creeks. One settler, Alfred Sundberg, has built a good home on Victoria Creek and raises 30 to 50 tons of timothy-hay annually.

A road runs from Hydraulic to Sundberg's and also to the dam on Swift River; a trail leads to Maud Creek, thence to Quesnel Forks; another trail leads from Victoria Creek to Cottonwood, 27 miles distant on the Barkerville Road, and a third trail, now fallen into disuse, from Swift River to Stanley.

The section is subject to severe summer frost, some years proving fatal to the potato-crop, but hardier vegetables are grown successfully. There is sufficient precipitation to make irrigation unnecessary.

However, it must be borne in mind that the locality is remote; there is no dependable market available, and it is not a locality that is suitable for agriculture under present conditions. Stock would do all right, but there would be a long season in which to feed, and a hay-crop of $1\frac{1}{2}$

tons per head would be necessary. There is excellent summer range, a luxuriant growth of grass and vetches covering the country. At the present time the moose is making good use of it, and we saw moose every day in the locality.

A creamery has been erected in Quesnel, to be operated under Government supervision during the coming year, and through the arrangements of the Department of Agriculture the settlers have been enabled to obtain dairy stock. Dairying as the base of mixed farming is thus given an opportunity to develop, and the district is well suited for it. If this proves successful, presumably other dairies will be erected and an inducement thereby given to settlers throughout the district to produce and make good on their places. A number of returned men have taken up farms in the Cariboo under the Soldier Settlement Board and are doing well. Agriculture and stock-raising will be the permanent industries employing most people; mining and lumbering will undoubtedly also develop to a certain extent.

EXTRACT FROM THE REPORT OF J. F. CAMPBELL.

DATED NOVEMBER 20TH, 1920.

[Mr. Campbell was employed in 1920 by the British Columbia Government in making surveys in the Fraser Valley between Quesnel and Prince George.]

BLACKWATER RIVER.

The Blackwater, a clear, swiftly flowing river, is formed by the junction of the Euchariniko and Nazko Rivers, and flowing eastwards empties into the Fraser in latitude 55° 20' north. For a distance of 12 miles from the Fraser River (to where the Yukon Telegraph Line crosses the Blackwater) the river flows through rocky, narrow canyons and the valley is narrow. From this point (the Telegraph Cabin) the valley widens to a width of from 2 to 3 miles and is lightly wooded with small pine and poplar. Small meadows varying in size from 5 to 20 acres are scattered throughout the valley. In places, especially on the southern slope, open fir timber is encountered running from 15,000 to 20,000 feet per acre. These patches of fir timber seldom cover more than 20 acres. The land in the valley is level and rises by terraced benches to 400 feet above the river. The country extending to the south is broken by the Telegraph range of hills and no agricultural land in large areas is available. To the north, between the Chilako and Fraser Rivers, is a large plateau, undulating in character, and the timber, principally lodgepole pine and scattered poplar averaging 8 inches in diameter, is very open. The soil is sandy or clayey and the hollows are swampy, with a growth of heavy willows and alders. The Blackwater River is the northern limit of bunch-grass, and this grass grows in abundance on all open hillsides. Sage-brush was noticed on the northern slope, this being an exceptional distance north for this particular growth. Along the river to the west the country assumes a more open aspect and is ideal for stock purposes. Many ranchers are located on the Nazko and Euchariniko Rivers and are making a success of stock-farming. A short distance from the Euchariniko River is Pelican Lake. There are many large meadows in this vicinity and quite successful stock-ranches are in operation. The snowfall is not excessive, but quite sufficient to supply plenty of moisture for the soil. Cattle will in an ordinary winter feed on the hills all winter, but it is usually the custom to put up a certain amount of hay in case the winter is unduly severe. Hay and grains have been fairly successful, but no great attempt has been made to grow grain on a large scale.

The easiest and quickest way to get into the stock country of the Upper Blackwater is via Quesnel. From this point a road runs to the Nazko River, a distance of 60 miles. The road from Quesnel to Prince George branches at the Blackwater River: one road goes to Fraser Lake, one to the Euchariniko River, and the other to Prince George. At the river is located a telegraph-station of the Dominion Government.

BEAVERLY CREEK.

Beaverly Creek flows north-westerly from West Lake and empties into the Chilako River. West Lake is about 16 miles south from Prince George and the creek crosses the Blackwater-Prince George Road 12 miles from Prince George. The creek is from 30 to 50 feet wide and the current slack. Half a mile north from the lake marshy meadows extend a quarter of a mile on either side of the main water-channel. These meadows are very fertile and support a luxuriant growth of wild grasses. In many places the grass grows to a height of 5 feet. If drained, which

I believe could be easily done by breaking some of the old beaver-dams, at least 1,000 acres of meadow land lying along the creek, between the lake and the road, could be made excellent agricultural land. The land on either side of the meadows is open poplar with plenty of grass for grazing purposes. Farther along the creek on the west side of the road are a number of farms that have from 50 to 100 acres under cultivation. The road from Prince George parallels the meadow land half a mile to the west, and there are a number of roads branching off the main road and running west to the farms in operation.

CHILAKO RIVER.

The Chilako, locally called the Mud River, is a sluggish stream meandering through a narrow valley. The valley nowhere exceeds half a mile in width, but the land in the bottom is exceptionally fertile. The river empties into the Nechako River about 25 miles above Prince George. For 20 miles from its mouth it is well settled and the majority of the farms are producing excellent crops. The valley is level and wooded with cottonwood, spruce, and alder. There are patches of meadow that can easily be increased to a considerable acreage by very little clearing. The clearing of the large cottonwood and spruce stumps is rather hard, but can be made much easier by the use of powder, something that has not been used to any great extent in this area. The open patches produce a luxuriant growth of wild grasses, with a good sprinkling of vetch mixed in, making a very high-grade feed, which is preferred to timothy by dairymen. The price of hay ranges around \$30 to \$40 per ton, the yield being about 2½ tons per acre. Alfalfa grows well, yielding from 1½ to 2 tons per acre, and can be cut twice and the field pastured. Red clover, alsike, and other clovers grow well. Timothy in the rich bottom lands grows from 3 to 4 feet in height and yields from 2 to 4 tons per acre. Brome-grass, which grows about 5 feet high and then falls down, can be cut twice in a season and the field pastured. The soil in the valley is a sandy silt, built up of different kinds of earth, with a large percentage of decayed vegetation and mould of different kinds, and is very rich and productive, so rich that farmers are inclined to seek the short- and strong-strawed varieties of barley, oats, and wheat so they will stand up to mature. Potatoes, beets, mangels, etc., all do well under cultivation.

The valley is surrounded by bench land with a sandy or clayey soil, and some settlers prefer it to the valley lands. The timber on the benches is a light-growth poplar and clearing in the majority of cases is fairly light. There are large stretches of good land to the west of the river, between the Telegraph range of hills and the river. There are good roads to the Chilko River. The main wagon-road from Prince George to Fort Fraser crosses the river a few miles from its mouth. A good road branches here and continues up the river for about 15 miles. A school is located in the valley and the settlers hope to obtain a post-office shortly.

EAST OF FRASER RIVER.

The country on the east side of the Fraser along the line of the Pacific Great Eastern Railway, now building, is being rapidly settled. Most of the country has been burnt over and second-growth poplar and willow is the principal growth. Where not burnt the timber, spruce and fir, is fairly heavy and a number of small sawmills are in operation, supplying the settlers with building-lumber. Most of the farmers are within a few miles of the Fraser River, and although there is no road communication they are able to haul their produce to the river and then by steamboat to the market. A road, Prince George-Quesnel, is now building on the east side of the river, and this, with the completion of the railway, will aid the farmers enormously and bring them within a few hours of a ready market.

From Fort George Canyon south the winters are noticeably less severe and the snowfall lighter than a few miles farther north. This has induced many settlers to locate in this area. The crops are generally excellent; the wheat especially noticeable for its heavy yield per acre.

WEST OF FRASER RIVER.

The country paralleling the river on the west side and extending back a few miles is more or less rough and broken. The whole country has at one time been burnt and is now wooded with small poplar and willow. There are many patches that escaped the fire, and green timber, generally spruce, grows to a diameter of 30 inches. In places the river-bench is about half a mile wide and practically open, with very little timber except a few cottonwoods. These river-flats are excellent in every way and are noted for their heavy crop-producing qualities. The

bench from the river-bottom to the top is about 250 feet high, and the country for a few miles back is usually very broken, the soil being either very sandy or gravelly. There are exceptions to this, and in places a few hundred acres in extent the land is all that could be desired. The country is well watered; the creeks, however, generally being in deep gullies. These gullies run back from the river about 2 miles, when the top of the bench is reached.

A road parallels the river about 10 miles to the west and is in fair condition for loads not exceeding 1,500 lb. A few sleigh-roads branch from the main road and run towards the river. With very little labour these could be put in first-class shape.

TIMBER.

Lumbering is one of the principal industries of this area. Many sawmills are located along the line of the Grand Trunk Pacific and give employment to thousands of men in the open season. No doubt, when the Pacific Great Eastern Railway is completed south from Prince George, many mills will be located along the line, as there are large areas of merchantable timber paralleling the Fraser River that can be profitably cut. There is a great deal of timber that is not satisfactory for lumber, and I have no doubt that in time this will be converted into pulp, for much of the waste or scrub timber that is at present wasted can be used by pulp-mills.

TRANSPORTATION.

The country is gradually being opened up by new roads or else improving the existing roads. The past year, due to the heavy and unexpected rains, has been very hard on the roads, and in many cases a road that has for years given satisfaction has this summer been turned into a quagmire. A new road is now building from Prince George to Quesnel, and this will give the settlers on the east side of the Fraser River direct means of transportation between both towns. The Pacific Great Eastern Railway is also under construction and will shortly be in operation between the Coast and Prince George.

CLIMATE.

Winter may be considered to last from November 15th to April 15th. Some years winter sets in early, and in other years, like the present year, after a stretch of cold weather in the later part of October and early November, the temperature rises and bright sunny weather lasts until well into December. The average snowfall is from 2 to 3 feet and this quickly disappears in the spring. The average mean temperature for the winter months is about 22° F. above zero. The average summer and fall temperatures and rainfall for the years 1916-17-18 are given here:—

	Temperature.	Rainfall in inches.
June	56	1.34
July	57	2.37
August	58	1.44
September	52	0.79
October	42	1.49

MINERALS.

There is very little mining activity in this area. On Stone Creek and Hixon Creek, both on the east side of the Fraser River, there are two small camps that are working on quartz-gold prospects. Farther up the Fraser, near Giscome Portage, considerable work has been done on a claim held by O. Eden, and very good results have been obtained, especially from galena indications. On the Blackwater River, near the present Forest Ranger Station, there are indications of coal. In one place a seam about 18 inches wide is exposed, the coal being a shaly nature. Most of the rock in the vicinity of the Blackwater River is marked by iron-rust, and in one or two places low-grade galena was noticed.

GAME AND FISH.

The game, especially near the Fraser River and on the benches close to the river, is very plentiful. Moose and deer are in abundance and it takes very little skill as a hunter to obtain a supply of fresh meat. Bears are very numerous, many of the settlers having considerable damage done to their berry-crops by the black bears. Fish are also plentiful, and there is hardly a stream or lake that will not supply a good catch of trout.

EXTRACT FROM THE REPORT OF E. J. GOOK.

DATED NOVEMBER 26TH, 1920.

[Mr. Gook was employed in 1920 by the British Columbia Government in making surveys in the Fraser Valley between Quesnel and Soda Creek.]

The physical characteristics of the large area covered by these many small surveys may be described as a long strip of land about 25 miles wide running north and south between the Fraser and Quesnel Rivers, with the latter's tributary, Beaver Creek, both of which flow to the north, whilst the Fraser River flows to the south. This strip of land rises from each river-valley in varied slopes with benches, forming on top a plateau, in parts broken up by creeks, meadows, and swamps which drain to their respective valleys. This plateau attains a maximum elevation of about 3,000 feet above sea-level, although there are peaks about 500 feet higher.

Transportation is favourable and varied: Steamboat service on the Fraser River between Soda Creek and Prince George. Roads down each valley, with several crossing over between each. Rail service is provided by the Pacific Great Eastern Railway, the steel of which is rapidly approaching Quesnel, and its operation will no doubt produce addition and improvement to the wagon-roads as feeders thereto.

The area under report is adjacent to the famous Cariboo gold-mining district, Barkerville, Keithley Creek, Hydraulic, etc., and a revival of the mining industry will undoubtedly resuscitate its agricultural development.

There are several small areas of timber that the advent of the railway will render marketable, but there is insufficient to promote the lumber industry to any great extent.

To characterize generally the soil of such a large area as that operated in this season—some 2,500 square miles—might be misleading to settlers unacquainted with the changing variety of soils met with in the Upper Country of this Province, so this feature has been dealt with later on in reporting particularly on the localities in which surveys were made. Being an old-settled district, the possibilities for farming and stock-raising have been long established, and the vigorous policy of removing encumbrances from unoccupied and unimproved surveyed land is beginning to transform into *bona-fide* settlers' homesteads pre-emptions hitherto looked on as sanatoria by jaded trappers and prospectors. The combination of meadows and pasture land with creameries (one already established by the Government) and a convenient railway form an optimistic prospect indeed.

The timber on lands suitable for cultivation is not heavy, and consists for the most part of scattered poplar, small spruce, and upland willow, amongst which wild grasses, peavine, and vetch grow in profusion. Open fir, occasionally reaching 3 feet in diameter, prevails on hill-sides, and sufficient timber for building, fencing, and fuel can be depended on everywhere. Many parts have been burnt for a number of years and the second growth consists of light poplar and willow. With the present high prices of labour, etc., the cost of clearing is hard to estimate, but from \$30 to \$50 per acre might be taken as some indication. Bearing in mind the corresponding increased value of a resulting crop, with hay at \$50 to \$80 per ton, clearing is undoubtedly profitable.

The climate is moderate. Summer from May to September. Warm days with cool nights, with the possibility of light summer frosts which may affect garden crops only at the higher altitudes. In the lower valleys there is practically little risk. This fall was exceptionally wet, rain prevailing from about September 9th for a month, delaying the getting-in of hay and affecting roads. To date there has been no snow and the weather has been very mild.

Moose, deer, and bear signs are numerous. Grouse are plentiful, whilst trout abound in streams and lakes, particularly Mud (McLeese) Lake and Big Lake.

SODA CREEK.

Several pre-emptions were surveyed on the high ground north and east of Soda Creek on the other side of a ridge of timber which separates McLeese Lake from the Fraser River. One, unoccupied, consisted of a strip of spruce bottom interspersed with small meadows on the Alexandria-Beaver Lake Road, some 9 miles from Soda Creek and 2 miles from the Pacific Great Eastern Railway. The valley in which this is situated looks as if at one time it might have been the outlet for Sheridan Creek. There is an old mining-ditch dug by Chinese along this valley to the Fraser River which is still in a fair state of preservation. The bottom land

surveyed is black muck soil, but clearing will be heavy, as there is a dense growth of spruce and willow. A few clean spruce up to 14 inches are to be found. There is no other agricultural land adjoining. Southward the ground rises to the timber ridge above mentioned. Northward it rises in stony burnt-over slopes covered with light poplar to a bench which extends towards Cuisson Lake and the headwaters of Cuisson Creek. On this bench the growth is very open poplar up to 10 inches, with scattered bluffs of spruce. In parts there is a good black soil from 6 to 12 inches in depth, beyond which the soil is mixed with small sharp pieces of stone. At present this affords good range, but it should be easy to clear and cultivate. There are a number of sloughs and meadows on this bench. One such had been staked as a pre-emption and was surveyed. It lays about three-quarters of a mile directly north of Mud Lake. There is a steep shale-slope from the bench to the lake, but eastward about a mile up Sheridan Creek a good grade has been used to cut a hay-road. The meadow could be drained and when cleared of willow should afford 30 acres of hay land.

Another old pre-emption surveyed consisted of a meadow with a good deal of willow, about 5 chains wide, along Soda Creek, some 8 miles east of the village of that name. There is excellent summer range in the vicinity, but apparently little use is made of it.

BEAVER LAKE-ALEXANDRIA ROAD.

This road leaves the Cariboo Road at Mile-post 177, some 12 miles north of Soda Creek. At present it is only a second-class road, but as it is the shortest way to the railway from the Beaver Lake-Quesnel Forks country it will no doubt increase in importance. Toward Beaver Lake a number of settlers have taken up land, and a block of three lots was surveyed on Whitestone Lake, 12 miles west from Beaver Lake. The elevation is 2,600 feet, but the land is easy clearing and there are many open spaces that would stand cultivation. Around the end of the lake to the south about 20 acres of wet slough was included in one lot. By cutting out beaver-dams at the north end of the lake it could be sufficiently lowered to transform this area into meadow land.

About 6 miles north-west of Whitestone Lake and west of Fredy Creek a lot was surveyed consisting of a meadow at the foot of what was named Philemon Lake. This place had been squatted on and hay cut some years ago. A returned soldier was prepared to take it up.

BEAVER LAKE.

From Whitestone Lake to Beaver Lake the road runs along what is known as Peavine Ridge, and two lots were surveyed here for waiting pre-emptors, one of whom had commenced improvements. The soil is black and when cleared of open poplar should prove profitable to cultivate. Close to Beaver Lake the ridge has been burnt and there is a growth of small poplar. The soil becomes lighter and more stony, but should afford good pasture for the valley holdings, especially for sheep, which are on the increase in this part of the country. There is good water on the ridge; the elevation averages about 2,600 feet above sea-level.

BIG LAKE.

Six pre-emptions were surveyed at the east end of Big Lake. Most of them have been reported for cancellation, as they appear to have been abandoned. These lots are strung out along a chain of lakes which drain into Big Lake, which latter drains to Beaver Creek. The elevation is about 2,500 feet and the growth is fairly open and clearing not difficult. The surface is undulating and the grassy slopes afford good pasture. It is well watered and the soil varies considerably from black peaty muck in the portions of willow bottom to gravel on some of the ridges. The medium-coloured loam soil that prevails should, when the land is cleared, be suitable for the cultivation of grain, as has been successfully demonstrated on similar land around Big Lake. There must have been good crops produced in that neighbourhood at one time, but the cultivated lands lying idle evidence the general complaint against the high cost of and the uncertainty of labour that is hindering agricultural production.

One pre-emption was surveyed at Marguerite Lake, some 6 miles from Big Lake on the road to Soda Creek. It lay between two occupied holdings, and although improvements had been started it had apparently been abandoned. Good oats and garden produce were raised on adjoining land, and the country affords good range.

KERSLEY.

Three lots were subdivided at Kersley, some 12 miles south of Quesnel on the Cariboo Road, where there is provision for a railway-station. Each quarter is held under pre-emption and most of them are occupied and being improved. The soil is a good loam and clearing is not heavy, most of the country having been burnt over and the second growth is but light poplar. This place should become a thriving settlement.

COTTONWOOD.

Three miles north from the 10-Mile House on the Quesnel-Barkerville Road a small meadow held under pre-emption was surveyed. Slough-hay had been cut on it during past seasons, but it had not been occupied for some time.

Two miles farther north on the Cottonwood River a good piece of bottom land was surveyed. The only present means of access is by trail, but a road is being cut. Good garden produce is raised and washing for gold appears to be profitable. There are several mining prospects at various points on this river receiving attention.

North of the river the country rises to a lightly timbered bench that extends north and west of the Ahbau River, indicating a favourable extension eastward in time of the surveys at present existing from 10-Mile Lake north.

Another record was surveyed at the junction of Boyd (Chisholm) Creek and the Cottonwood River, some 3 miles below the Quesnel-Barkerville Road Bridge and Post-office. It is reached by means of the Ahbau Lake and Willow River Trail. The lot comprised about 35 acres of river-bottom, with a silt soil timbered with scrub spruce and cottonwood. The balance is poplar side-hills. There did not appear to be much agricultural land in the vicinity along the river, and the plateau above is high, with stony and gravel soil.

On the Quesnel River, about 5 miles south from the 13-Mile House on the Barkerville Road, was a pre-emption staked on an abandoned mining claim. The soil is silt along the river and produces grain and vegetables. The side-hills with several small benches slope to the south and should raise hay.

There appeared to be a stretch of poplar bottom on the other side of the river opposite worth surveying, but the river was too high to cross for a closer inspection.

QUESNEL RIVER.

At Sardine Flats, 17 miles from Quesnel, on the road to Hydraulic, an additional area was surveyed to a pre-emption and one full lot subdivided. Several settlers have taken up land in this vicinity the last year or two, and more land suitable for settlement could be found from here up to Beavermouth and on to Beaver Lake. One or two wanted to take up land in the vicinity of Joan Lake, but it was found impossible to survey same on this season's schedule.

On Beedy Creek, a tributary to Beaver Creek, one pre-emption was surveyed. There is a good piece of poplar bottom partly burnt over along the creek, but the valley here is narrow and there is not much bottom land available. On the bench above the creek there are several open patches with good soil. It is well watered. There is no road at present connecting Ben Lake with Beavermouth, only a trail, but one will undoubtedly be opened ere long.

COTTONWOOD CANYON-FRASER RIVER.

Three lots were surveyed here on a level bench overlooking the mouth of the canyon about 150 feet above the Fraser River. A road to the Tertiary Mine passes through each lot. It is understood that this project, on which considerable money has been spent, has only been temporarily suspended, and its revival should make these lots attractive for settlement. The steamer plying between Prince George and Soda Creek has a stopping-place half a mile away. The growth on these lots is light poplar, pine, etc., with peavine and vetch. The soil is sandy loam in places, in others a good dark loam of from 2 to 3 feet in depth. The subsoil is gravel. There is a small creek that runs from a muskeg through willow bottom, eventually reaching the Fraser River.

DRAGON LAKE.

Eight full-sized lots were subdivided here. There is every prospect of a good settlement at this point, as it is only 6 miles from Quesnel and the land is comparatively easy clearing, a greater portion of the area having been burnt over about ten years ago. The elevation is about

2,400 feet above sea-level and the soil varies, being chiefly a clay loam over clay and gravel sub-soils. The growth is poplar, pine, spruce, birch, etc., with many patches of willow bottom. It is well watered and to the north there is a large muskeg. Grain and vegetables are raised successfully on adjoining holdings. There are a number of pre-emptions recorded on the various quarters, but only one is doing anything, and the others are in line for cancellation proceedings. There is good summer range, but on account of the deadfalls in the burnt-off portions it is difficult for stock to gain access thereto.

EXTRACTS FROM THE REPORT OF G. R. BAGSHAWE.

DATED JANUARY 5TH, 1921.

[Mr. Bagshawe was employed in 1920 by the British Columbia Government in making surveys in vicinity of Horsefly and Williams Lake.]

MOFFAT CREEK.

The first survey was made for L. Walters on Moffat Creek, about 13 miles south from Harpers Camp, or 19 miles following the road. The land here is high and rolling, covered with jack-pine and poplar, interspersed with peat-swamps and occasional hay meadows. The best way in is by the road to 108-Mile House. About a mile above McIntosh Lake a road leads off to the east, past Mikelson's ranch, for about 5 miles; from the end of this wagon-road a trapper's trail leads to Walter's pre-emption 2 miles farther in. At the north-east corner of this claim is a small lake out of which flows Moffat Creek. There is a small stand of pine and spruce south of this lake, but we did not examine its content.

BELLS LAKE AND SKUNK CREEK.

Travelling the 150-Mile House Road from Harpers Camp for 5 miles, a wagon-road leads off to the left to Bells Lake, about a mile distant. There are three ranches round the lake, located in good hay meadows. One of these we surveyed. Farther back are several small meadows of varying size. Whilst staying here we were requested to survey a lot on Skunk Creek for a prospective settler.

Skunk Creek parallels the Horsefly Road on the north side in a deep valley, in the bottom of which is a strip of meadow 3 to 4 chains wide. Across the valley is a rolling country timbered with poplar and jack-pine. Half a mile below our survey Skunk Creek joins Gravel Creek in an open meadow upon which hay was being cut. I am informed that in this valley the snow melts considerably earlier than in the surrounding country.

UPPER HORSEFLY RIVER.

It being necessary to go up the Horsefly River to amend a survey on Woodjam Creek, we were requested to survey three parcels for intending pre-emptors. The river at Harpers Camp is some 200 feet wide. Following up-stream for the first 2 miles, it runs through a wide valley with meadows on each side, in a horse-shoe bend, concave to north.

This land has long been settled and farmed. Continuing up-stream, the river bends to the right, thus making a complete letter S, and the valley narrows down, with high benches along the sides, till Sucker Creek is reached, some 3 miles farther. For the next 3 miles the river flows with a heavy fall through a deep canyon. Above the canyon the valley opens out again to a width of quarter to half a mile and continues thus for 8 miles, as far as the party went.

Woodjam Creek enters the main river from the south a mile above the canyon, forming a large meadow flat at the junction. The bed of the main valley is almost level and forms one long meadow about 30 chains wide, through which the river flows at 3 miles an hour (September). The soil is a deep fine silt, in which the stream has cut a channel some 8 feet deep and 100 feet wide. The course of the river takes many turns, making a traverse 40 per cent. longer than a direct line. Of this more later. There are also numerous horse-shoe sloughs leading from and back to the river, showing the position of old channels. At the time of survey the river was about 5 feet deep and fords at intervals. There are several ranchers in the valley. Mr. McKenzie, of the Woodjam, owning the largest. The main crop on the bottom lands is hay, the soil being too cold to grow grain successfully on account of floods. On the benches above, however, can be grown excellent oats and garden produce. Albert Patenaude, 6 miles above Woodjam, has a fine garden, in which we saw potatoes up to 3½ lb. weight.

Irrigation is not necessary, but may be employed to advantage in dry seasons. The greatest drawback to the whole valley is the backing-up of the river at high water, and of still more concern is the slowness with which it escapes again. Our attention was called to this several times, and the ranchers are most anxious that an examination be made to see if it cannot be remedied by cutting a deeper channel at the top of the canyon.

From my own observation there appeared to be two matters for consideration: First, the trouble in the upper reaches seems to be that the water cannot drain away fast enough owing to the very slight fall of the river, which, judging by the flow, is some 2 to 3 feet per mile along its course. This, owing to the many turns, would give a fall of 4 feet if the river were straightened. In one place it travels three-quarters of a mile around a bend, the ends of which are only a quarter of a mile apart. If a straight ditch were cut through the soft silt the water would soon wash a new channel with three times the fall of the old one. By an extensive use of this method a great improvement could be made in all but the lower part of the valley, some 3 miles above the canyon or 2 above the Woodjam Ranch, which would be in a worse position than at present. To allow the water to escape it would be necessary to open a deeper and wider channel at the top of the canyon.

The valley appears to have been at one time the bed of a lake, dammed up by a slide of rock through which the river has now cut to form a gorge. This slide forms a wall of rock over which the river flows as over a dam, the bed below falling away on a grade of about 0.6 per cent. For three-quarters of a mile above the water is almost stagnant, some 7 feet deep on a silt bottom. At the request of the settlers I took, on my way back to Harpers Camp, levels for a distance of 200 feet above and 500 feet below the top of the canyon, with a view to seeing the feasibility of cutting a deeper channel. A profile and cross-section will be forwarded as soon as prepared.

I consider this one of the finest stretches of meadow land in the district and one which would well repay expense in improving. The valley is about 2,400 feet elevation.

WOODJAM CREEK.

Woodjam Creek drains into the Horsefly about 9 miles above Harpers Camp by river or $7\frac{1}{2}$ by road. There are some good open flats along the lower mile or two, some of which have been ploughed and cropped with grain. The valley becomes narrower farther up, but there is still some fair bottom land vacant. Three miles above the mouth a pre-emption was surveyed by J. B. Patenaude. Above this the creek runs through a rough timbered country.

NORTH SIDE OF HORSEFLY RIVER.

There is a stretch of good land on the north side of the Horsefly Valley, drained by the Sucker and Marten Creeks. Some of this is surveyed, but there is still a large unsurveyed area suitable for settlement, containing a number of hay meadows. One of these was surveyed by T. R. Greer. I understand that there are other locations equally good.

TOWNS, SCHOOLS, AND POST-OFFICES.

Harpers Camp is the nearest town and consumes all the produce raised. It has a settled population of about 100, besides being the headquarters for the district. The school, postal and telegraph office are located here. A stage runs weekly with mail to Williams Lake, on the Pacific Great Eastern, 46 miles distant by way of 150-Mile House.

CLIMATE.

The Horsefly country has a greater rainfall than that farther west and irrigation is not necessary. There is a somewhat heavy snowfall which remains late in spring. The moist climate makes a thick vegetation and the heavy growth of grass and peavine give excellent summer range for stock. The heavy snowfall makes winter-feeding necessary.

The Horsefly and Beaver Valleys are well adapted for dairying and mixed farming, but the high land to the south is essentially a stock country.

GAME.

Bear-tracks were seen continually, but few deer. On several occasions the lines ran through new beaver-workings, the beaver being plentiful along all the creek-flats. Harpers Camp is a big trapping centre, the furs being mostly mink, marten, red fox, and coyote.

WILLIAMS LAKE.

In October the party moved to Williams Lake and surveyed three pre-emptions some 7 miles to the north on the old Soda Creek Road. These consisted of hay meadows about 2,700 feet elevation.

FRASER VALLEY.

A pre-emption was surveyed for M. Duffly between the mouths of Williams Lake Creek and Chimney Creek. It contains some good bench land and a spring, but is difficult of access, the best route being via a trail along the river from Isnard's ranch at Chimney Creek. I am informed that there is a trail direct over the mountain from Williams Lake, but it is very rough, descending some 1,000 feet down to the Fraser.

EXTRACT FROM THE REPORT OF R. W. HAGGEN.

DATED NOVEMBER 3RD, 1921.

[Mr. Hagggen was employed in 1921 by the British Columbia Government in making miscellaneous surveys in the Cariboo District.]

Surveys were made during the past season in the following localities in the Cariboo District: Blackwater, 10-Mile Lake, Quesnel, Big Lake, Beaver Lake, Horsefly Lake, and Moffat Creek. The work consisted largely of the subdivision of old surveyed lots into 160-acre parcels, involving the retracement of old lines, which are now overgrown in most cases.

BLACKWATER SECTION.

Eleven lots were subdivided near the mouth of the Blackwater River, which enters the Fraser some 45 miles above Quesnel. The northerly of these sections lie partly on very steep hills which border the Blackwater Valley and can hardly be considered as desirable for settlement, although one pre-emptor, who has been in the district a number of years, has located in Lot 3591, on a bench near the river, at the mouth of the Tako River, a tributary of the Blackwater.

The Blackwater itself is a large stream, draining from the Euehiniko and Nazko sections. The Yukon Telegraph Line and the road from Quesnel to Vanderhoof and Prince George cross the river about 15 miles from its mouth. From the crossing the stream is a series of cataracts, flowing in a deep, rocky gorge. The hillsides are wooded with a growth of gnarled fir, with occasional small benches covered with poplar or jack-pine.

Vandenberg's pre-emption lies on a trail which was constructed some years ago on the north side of the Blackwater. On either side it is so steep as to be almost impassable for horses, even though lightly packed, and it is very difficult to see how the great obstacle of transportation is to be solved; any road-construction would necessarily be expensive. My own opinion is that settlers would be very unwise to locate in this canyon.

The surveys south of the Blackwater lie on a rolling bench following the Deep Creek Valley. A trail was built, leaving the Quesnel-Blackwater Road at the Deep Creek Cabin, a shelter-cabin built for linemen on the telegraph-line. Along the westerly sections there is a good percentage of very fair land, in some places fairly open, in others wooded with a growth of poplar from 2 to 6 inches in diameter. The Deep Creek Cabin is about 33 miles from Quesnel, and these lots lie from 5 to 9 miles north of the cabin.

The soil here is generally a clay loam of considerable depth and appears to have good productive possibilities. It is unlikely that irrigation would be necessary for general crop production; water could be obtained from Deep Creek, but, as the benches lie between 200 and 300 feet above the valley, the conduit would be long and would probably cost more than it would be worth. Domestic water should be obtained easily; there are some springs and indications are that wells would strike water at shallow depth.

As is general in the country north of Quesnel, the country has been fire-swept some years ago and the present bush is all second growth. There is considerable *brulé*. Towards the break of the Fraser Valley the land becomes very rugged, with a tangle of *brulé* and standing snags. Here the soil is very poor.

As there are no residents in this section, no data were obtainable as to rainfall or summer frost. However, it is reasonable to say that depressions would be more or less subject to frost, while uplands and slopes would not be.

The Blackwater River is a favourite spot for trout-fishing and splendid catches are made. In Deep Creek there are brook-trout. Beaver are numerous on Deep Creek and springs. Bear and deer are quite plentiful.

In the future, although not immediately, it is quite possible that this section may be in demand for a mixed-farming settlement. At the present time settlers can obtain land of much better quality nearer to markets.

VICINITY OF QUESNEL.

The altitude of this land is from 2,400 to 2,800 feet. From 10-Mile Lake the land rises in a series of benches to the east. A forest fire years ago destroyed the original forest, which was heavy fir, and in most places burned the humus in the soil, leaving the subsoil, gravel or hard-pan, exposed. In the course of time a fairly dense second growth of poplar and pine has sprung up and a shallow humus developed on the surface. Several pre-emptions have been taken up in this locality, mostly on a big swamp lying along the railway, and efforts are now being made to reclaim this swamp.

On the benches the cost of clearing would be from \$40 to \$60 per acre. It would seem doubtful if the land is worth clearing at the present time, although it may prove productive. A rank growth of peavine and weeds indicates the surface humus to be quite rich, but one is diffident about declaring that the land is suited for farming until some pioneer settler proves or disproves it by actual test.

The ground should be free from frost, there is a good average precipitation, and it lies adjacent to the railway, three very favourable factors.

Two miles east of 10-Mile Lake the summit of the divide between 10-Mile and the Cottonwood River is reached, and the final descent into the Cottonwood is very steep. At the present time considerable prospecting is being done for placer and dredging ground on the Cottonwood, and good values have been found in the gravel benches above the river; whether the ground has been prospected sufficiently to determine its suitability I cannot say. However, it is quite within the realms of probability that gold-dredging will within the next few years be undertaken on a large scale in the Cottonwood Valley. All who have tested the ground seem optimistic. The installation of such a plant is, however, very expensive, and in these days of money tightness none but very wealthy syndicates can install it.

BIG LAKE, BEAVER LAKE, AND PEAVINE RIDGE.

This section contains a large area, lying within the drainage-basin of the Beaver Valley, including the tributary valley of Beedy Creek, Big Lake Creek, and Peavine Ridge Creek. It lies within reach of the 150-Mile House-Quesnel Forks Road, 24 to 35 miles from the 150-Mile House, 10 miles farther from the Pacific Great Eastern Railway at Williams Lake. A fair road from Macalister Station, on the Pacific Great Eastern Railway, enters the area at Beedy Creek, 19 miles from Macalister; while another road, from Big Lake to Soda Creek, enters it at Marguerite Lake, 18 miles from Soda Creek.

The area comprises a rolling plateau, its elevation being between 2,500 and 2,800 feet. There is no merchantable timber within the area, although on many ridges there is fir of fair size. On about 30 per cent. of the whole area there is a growth of light poplar, which can be cleared at a cost of from \$20 to \$50 per acre, varying in the different spots. In parts there is jack-pine and spruce. Over the whole area there is a luxuriant growth of peavine, fireweed, and vetches. This has been of great use to the settlers, and I have seen them cut enough of this for hay to winter their stock; furthermore, the stock do well on it and are turned out in good shape. Throughout this area there is a good proportion of deep loam soil. The ridges are gravelly. Timothy, clover, grain, and vegetables of the hardier varieties grow well, the growth being really prolific. Summer frosts are apt to do damage to susceptible crops in the depressions, but on the uplands or slopes they do not occur.

One settler, Mr. McMaig, who located on the summit of the ridge in 1919, had this season 60 acres in crop. Most of the settlers are getting their places in shape for production.

While there is not a great deal of surface water in the area, wells yield water at shallow depth. There is ample rainfall and the soil is retentive, irrigation being quite unnecessary.

The whole section, of which the area under review is a portion, extending from Miocene, on the Horsefly Road, to Horsefly and Horsefly Valley, Beaver Lake and Peavine Ridge, is, I consider, the largest area of fairly contiguous farming land south of the Grand Trunk Pacific.

It has in the past been used to some extent as a stock country, but is not very suitable, the winter season being too long, involving great expense for winter-feeding. Throughout the area there is magnificent summer range of soft leguminous feed, but this is usually badly perished in October, and the feeding of stock is usually necessary from the early part of November till the end of April.

A number of settlers have located within the area during the past two years and are well satisfied with it, but all agree that it is a mixed-farming, dairying country. It is hoped that in the near future a creamery may be established at Williams Lake or some fairly central point.

When dairying is established as a base for the mixed-farming industry there is no doubt that the country will develop very rapidly into one of the best mixed-farming areas within the Province.

A creamery has been established at Quesnel during the past season and has done well. To the small farmer it is a great boon, as the semi-monthly cheque enables him to keep his farm going. In the past these men have had to keep their farms; now their farms keep them. It is to be hoped that as a further development a bacon-curing industry may be established within the district during the next few years.

At Twin Lakes, near Big Lake, some placer-mining has been done in the past, but no rich strike made. This year some further investigation seeking an old channel has been made. Throughout the area there seems to be a strata of limestone and there are several limestone hills.

Roads of good standard will be required within a short time to facilitate the marketing of produce; the present roads have been, as a rule, built along the lines of lease resistance for some temporary purpose; the Horsefly and Quesnel Forks Roads are not of high standard.

Within the area there are post-offices at Horsefly, Miocene, Ochiltree (Rose Lake), and Beaver Lake; public schools at Horsefly, Miocene, Rose Lake, Beaver Lake, and Big Lake. The post-offices are served by weekly stage from Williams Lake.

Many of the settlers have depended in the past on a grub-stake from trapping. Horsefly, formerly Harpers Camp, is the centre from which most of the trappers work, and in the past a great deal of fur has been brought there; the chief pelts being marten, beaver, and muskrat. With the falling market of fur and close season on beaver, many are abandoning trapping, and this greatly reduces the revenue of the country. Beaver are now very plentiful and much annoyance to surveyors is caused by their handiwork.

HORSEFLY BAY, QUESNEL LAKE.

Two amendment surveys were made on lots near the mouth of the Horsefly River, 15 miles up Quesnel Lake from the outlet. A dam at the outlet has kept the lake-water raised over flats at the mouth of the Horsefly for some years. Last winter a portion of this dam was blown out, as it was becoming unsafe under high-water pressure, and the flats at the mouth of the Horsefly have become accessible. There is only a small area of good soil here, the balance of the flats being sodden with water.

A road from Horsefly follows Horsefly Valley to within 3 miles of Horsefly Bay, and a foot-trail, pretty well filled with logs, extends to the bay. This is the usual route of parties going up Quesnel Lake.

Apart from the flats at the mouth of the Horsefly, the country is hilly and densely wooded with hemlock, fir, spruce, and cedar.

Quesnel Lake is a good trapping-ground. Within the lake splendid catches of trout are made.

MOFFAT CREEK.

Four lots were surveyed for intending settlers in the Moffat Creek Valley, from 8 to 10 miles from Horsefly, on a road which extends from Horsefly to Lac la Hache. Originally this road was used for hauling supplies to Horsefly Mine and was extended as a sleigh-road to Bullion

via Polley and Bootjack Lakes. Years ago the latter section fell into disuse and is now impassable even for a saddle-horse.

In Moffat Creek Valley there are numerous wild-hay meadows and some willow bottoms and poplar-flats. Some settlers have been there for several years and seem well satisfied. The soil is not of good quality as a rule, and the range is much poorer than in other sections of the district; however, the range is within easy reach of the valley. Lac la Hache, 37 miles distant, is the nearest point on the Pacific Great Eastern for settlers along Moffat Creek.

Beaver and muskrat are plentiful along this valley. Game of other varieties does not seem to be plentiful and there are few fish in the creek.

MOUNTAIN HOUSE.

Some ties were made from unconnected lots on the main Cariboo Road and Quesnel Forks Road to the old surveys at the Mountain (158-Mile) House. All land of any value here has been surveyed and taken up years ago. The ties run through fir and jack-pine on high, gravelly land.

GENERAL.

As was to be expected, the opening of the Pacific Great Eastern Railway has caused a considerable number of new settlers to come into the country. On the other hand, it has changed the conditions extant since the building of the Cariboo, when all mails, passengers, and supplies had to be hauled by horses over the long road from Ashcroft. During those years the ranchers did well raising horse-feed and the demand always equalled or exceeded the supply. Within very recent years hay has sold for as high as \$80 per ton in Quesnel and oats at 6 cents per pound. Those farms which have not prepared for changing conditions are yielding little income to-day.

Of the new settlers who are coming into the section, a number have farmed on the Prairies and have come to the milder climate and more reliable conditions prevailing in this Province. These settlers, practical farmers, realize that the development of a farm involves labour; at the same time they know to what efforts it is best to turn their energies, and it is quite certain that most of them will make good. They have a definite object in view, know what steps it is necessary to take to reach their goal, and have some capital to tide them over the period of development, thereby having a great advantage over the settler who, lacking capital, must work out during a considerable portion of the year in order to exist. In the past a great many settlers pre-empted lands with the sole idea of doing the minimum amount of improvements, obtaining a Crown grant, and waiting for some one to buy them out. To-day the great majority of pre-emptors are taking up places because they want to develop farms.

Mining in the Cariboo has been continued on about the same scale as heretofore in the Barkerville section. On the Cottonwood River prospecting has been done. The Kitchener Mine at Keithley Creek has been hydraulicking and prospecting has been done in the vicinity of Cariboo Lake.

At Rose Gulch and Cedar Creek, near the outlet of Quesnel Lake, prospecting has been done on high benches and some very promising ground uncovered. One claim at Cedar Creek is yielding splendid returns at practically the grass-roots: up to the present, however, no data are available as to the probable extent of the auriferous gravel; it may be only a pocket or may turn out to be a big discovery.

EXTRACT FROM THE REPORT OF J. F. CAMPBELL.

DATED NOVEMBER 4TH, 1921.

[Mr. Campbell was employed in 1921 by the British Columbia Government in making surveys in the vicinity of Ness Lake and of Bednestl Lake.]

Ness Lake, beautifully situated between gently sloping banks, has a firm sandy gravel bottom and is 5 miles in length. The width varies from three-quarters of a mile to a few hundred feet where it winds through narrow passages. On first observation the size of the lake is deceptive, due to its many bays and narrow channels, and appears much smaller than is actually the case.

The area locally known as the Ness Lake District extends back from the lake a distance of from 3 to 4 miles, the general height of the land being 300 feet above the Nechako River.

The elevation of the Nechako River at Isle Pierre, on the Grand Trunk Railway, is 2,082 feet above sea-level. The character of the country in this locality is distinctive from that usually encountered on the Nechako Plateau.

The first noticeable feature is the exceptionally heavy undergrowth of red willow, alder, and berries of different varieties. This undergrowth, which grows to a height of from 4 to 8 feet, is much entangled and matted and travel across country for this reason is at times extremely difficult. The heavy nature of the underbrush extends 3 miles to the south and 2 miles to the west, while to the north and east it is much lighter.

Another noticeable feature is the flatness of the country. This is usually a good feature, but in this case it is often difficult to obtain proper drainage, and in the spring the surface water lies in the depressions longer than is generally the case.

It was also noticed that there is no visible outlet to the lake, although the water-level at present is very little higher than it was some years ago, the higher water-level possibly being due to the heavy rains of the past summer. This tends to give the impression that there is an underground outlet to the east, where the ground is swampy for a considerable distance back from the lake.

The soil to the south and west is a deep black loam, 2 to 4 feet in depth, with a clay subsoil, while to the north and east it is more of a chocolate-coloured loam of the same depth with a clay subsoil. On top of the soil the leaf-mould is 2 inches in depth.

The general timber is poplar and cottonwood 4 to 18 inches in diameter, an occasional lodge-pole pine and spruce in the swampy areas. Where this land is cleared of the timber it is ideal for hay and oats, and from the indications of the growth of wild berries should produce a good berry yield. Wheat has been tried on the cleared land, but in all cases was sown too late in the summer to get a fair trial and was not a success.

There is considerable land that has the appearance of marshy muskeg, but when the mossy top is burnt off and the land drained and the soil allowed to dry, good crops of hay can be grown. Where the land is marshy a number of settlers are carrying out quite extensive drainage schemes, and areas of this drained land when put under crop have returned many times the value of the labour expended.

The majority of the settlers are recent arrivals from the Prairies, where lack of moisture in their particular district has made crop-failures for a number of years. They are well satisfied with the new location, although in some cases they were not familiar with clearing, and the progress made at first was slow; they have now got into the proper swing and expect to have small areas under cultivation next year.

The district is fairly well supplied with roads. Besides the road from Isle Pierre there is a new road building from Prince George to the east end of the lake, where it is now slashed, and from there will follow the southern shore west. This road will make the distance 18 miles to Prince George from the east end of the lake. There is another road branching from near the east end of the lake, and, going southerly, reaches the Nechako River at Miworth, on the Grand Trunk Pacific Railway. A Government ferry across the Nechako is in operation at this point and carries teams, wagons, etc., free of charge six days in the week, while on Sundays there is a charge of 25 cents per person and 50 cents per team.

ISLE PIERRE.

Isle Pierre is 30 miles west from Prince George on the Grand Trunk Pacific Railway. At this point the hills on either side of the Nechako River contract, and where the river cuts through a short canyon is formed, called Isle de Pierre Rapids. The name is taken from a small rocky island that lies near the right bank of the river, midway through the rapids.

On the north side the hills rise abruptly for 300 feet, while on the south there is a bench a quarter of a mile wide which the Grand Trunk Pacific Railway traverses. From this narrow bench the hills rise by a series of benches towards a rocky knoll 800 feet above the river and lying 3 miles to the south-west. This knoll is a prominent landmark and was used in the days before the railway as a guiding mark.

Running back from the river on the south or right bank are draws that have been formed by the action of the water from the melting snows in the spring of the year. These draws or gullies are 10 to 15 chains wide at the bottom and gradually ascend from the river until the top

of the bench is reached. The soil in the draws is very fertile and excellent crops of hay and oats are raised by the owners. One of these bottoms directly behind Isle Pierre Station is cultivated to the extent of 15 acres under oats, and the crop when seen in the latter part of July was 3 feet in height, with a good head. With the exception of the river-bottom bench, which is a quarter of a mile wide, and the narrow draws, there is no agricultural land until the top of the bench is reached, about 300 feet above the river. The bench on top is fairly level and the timber, principally lodgepole pine and small poplar, is scattered. Some years ago a fire travelled the country and the second-growth poplar is very open and the clearing light.

The soil on the river-bench is a sandy silt, with a heavy growth of wild grasses and strawberries. On the upper levels the soil is more of a chocolate loam, with a mixture of sand where the recent fire has destroyed the top soil. In many places, especially towards the south-west, rock-outcrop is noticed, and the agricultural land in this vicinity, with the exception of the actual river-bench, is limited.

The few farms along the river have generally had a successful year and the crops have been up to standard. The heavy rainfall experienced in the late summer destroyed part of the hay-crop, but with this exception the farmers are well satisfied with crop conditions.

BEDNESTI LAKE AND VICINITY.

Bednesti Lake, one of the many pretty lakes in this district, is 30 miles west from Prince George, midway to Vanderhoof. The Grand Trunk Pacific Railway is 6 miles to the north, while the main trunk wagon-road between Prince George and Fort Fraser parallels the lake a mile to the north. Two short wagon-roads branch from the main road, one reaching the lake near the western end and the other about midway along the north shore.

The lake is 4 miles in length and has a hard sandy bottom. Berman Lake, half a mile to the east, is connected to Bednesti Lake by Moses Creek, a stream 100 feet wide. A heavily loaded boat can be rowed from one lake to the other.

Bednesti is on the old Stony Creek Trail, which in days before the building of the Grand Trunk Pacific Railway was the main artery of travel between Fort George and Fort Fraser. Along the shore of the lake are many open spaces that have been cleared by campers in past and recent years, for Bednesti is celebrated for the size and number of trout caught in its waters. The Indian name for the lake, Bednesti, means big trout, and it still justifies its name.

A series of sharply pitched rises or hog-backs, a quarter to half a mile wide, parallel the north shore of the lake. These at intervals branch into the lake, forming gravelly spits a few feet wide and a few hundred feet long. This ridge of hog-backs starts about midway on the north shore of the lake and ends 2 miles to the east. This narrow strip of rough country lies between the main wagon-road and the lake and is more or less gravelly. On either side the country is level and wooded with scattered lodgepole pine, small poplar, and an occasional fir.

The land rises from the lake towards the north with a gentle slope and is fairly lightly timbered with pine and poplar, although there are patches where the timber is rather dense in growth but small in diameter. The soil is a chocolate-coloured loam, with gravelly knolls scattered throughout the area. The slope extends back for a mile, when the country levels out until the descent into the Nechako Valley is reached.

To the south of the lake the ground rises for 50 feet and then extends southwards with slight undulations until the base of Bobtail Mountain is reached. Along the lake-shore is a fringe of timber a few hundred feet in depth, while beyond this an old burn extends for many miles. This burn has cleared the country of its previous light growth of timber without injuring the soil to any great extent, although in any place that gravel lay beneath the top soil this is now exposed by the action of the fire. There are many meadows, both dry and marshy, throughout the burn, which sustain a heavy growth of wild hay.

Bednesti Lake drains to the east by Bednesti Creek, which empties into the Nechako River a few miles west of the Chilako River. This creek is remarkable for its tendency of disappearing underground for half a mile or more, and then reappearing, flowing stronger than ever. The old creek bed is well defined, but no water has passed along it for many years and it has now grown up in willows.

The land bordering the creek and for a quarter of a mile on either side has a luxuriant growth of wild grasses and vetch. A mile from the lake the creek-valley widens and there are many small hay meadows 5 to 10 acres in size. Two miles east from the lake, and also to the

south, hay meadows are encountered varying from 5 to 40 acres. On most of them hay is cut by the settlers in the immediate vicinity, and in winter, when the snowfall is light, they are used for winter pasture.

The country is rapidly being settled by farmers who are working hard and intend to make a success. Many of them have from 10 to 40 acres under crop and have a ready market at hand, either in Prince George or Vanderhoof. On the farm of A. J. Abery, 2 miles from Bednesti Lake, a tractor is used for ploughing and other farm-work. Although he has only been in occupation for eighteen months, half a dozen buildings are erected and 15 acres under cultivation. Two miles farther to the east H. B. Mason has 40 acres under crop, besides a dozen head of cattle in pasture. He has been in occupation for two years and is now shipping butter, beef, etc., to both Prince George and Vanderhoof.

There are many excellent pieces of land that would make good farms, but the land has to be carefully selected, as the country is patchy and the quality varies in a very short distance.

The road from Prince George that passes through this area is in first-class condition, both for heavy transportation and motor traffic. Two roads branch from the main road and run to the railway, one to Nichol Station and the other to Bednesti Station, and with these the farmers have very little difficulty in getting their produce to market.

TRANSPORTATION.

The main trunk roads west from Prince George are in good condition during the summer. In the spring and late fall the melting snows and heavy rains soften the mud top and heavy vehicle traffic cuts the road into deep ruts. This makes travel in the spring and fall of the year rather difficult for heavy loads, but in the summer and early fall the roads are in first-class condition.

A road runs from Prince George west 70 miles to Vanderhoof and continues to Fort Fraser. This road parallels the Nechako River at an average distance of 6 miles to the south, and is used a great deal for motor traffic between towns and by the settlers when hauling their produce to market. During the construction of the Grand Trunk Pacific Railway this road was used for the transport of material for the railway, and the bridges and embankments are built to withstand the heaviest loads.

The principal means of transportation is the Grand Trunk Pacific Railway. At most stations roads extend back to the main roads that parallel the river. At Miworth and Hulatt there are Government-operated ferries that transport teams and wagons free of charge across the Nechako River. At other points there are boats that carry passengers across the river.

TIMBER.

There is very little merchantable timber lying along the Nechako River. The only exception to this is tie-timber of lodgepole pine. Most of the timber that could be used for ties is to the north of the river and some distance back, and to transport the ties for a few miles and then cross the river entails too much expense. There are a few isolated sections of good timber for milling purposes near Bednesti Station, on the Grand Trunk Pacific Railway, but not enough to pay for installing a mill.

GAME AND FISH.

Game throughout the district is very plentiful. The moose are increasing rapidly and were frequently seen, especially near the roads which they use for travel. It is within the past ten years that moose have come into the district in any numbers. Previously they inhabited the country farther to the north and east, but now that the Indians are few in numbers and do little hunting the game is rapidly coming south. The deer are plentiful, but are much more difficult to hunt than the moose, as they are wilder and more apt to take fright at the least noise.

In most of the lakes camped by fish were easy to catch. Ness Lake has no trout, but plenty of ling that grow to a fair size. Bednesti Lake is well supplied with rainbow trout that readily take the fly. Catches of over a hundred trout have been made in this lake over the week-end. The Nechako River can be fished successfully at certain stages of water and fair catches made. Occasionally sturgeon are caught, sometimes weighing as much as 300 lb., but this is more the exception than the rule.

EXTRACT FROM THE REPORT OF W. C. MERSTON.

DATED DECEMBER 23RD, 1921.

[Mr. Merston was employed in 1921 by the British Columbia Government in making surveys in valleys of the Nazko and Chilcotin Rivers.]

CHILCOTIN VALLEY.

My first surveys were of three lots on the Chilcotin River, which completed the survey of vacant agricultural land in this vicinity. With the exception of a few scattered acres along the foot-hills, there is now no unsurveyed agricultural land in the Chilcotin Valley. I continued by way of the Chilcotin Valley to Chezacut, following a wagon-road up the Clinchintampan River, past Temapho Lake (formerly known as Sucker Lake), and on to Aneko Creek.

The valley of the Clinchintampan contains the largest stretch of meadow country that was seen this summer. This valley is some 6 or 7 miles long, with an average width of about $1\frac{1}{2}$ miles. In former years it was covered with brush, but this to a great extent has been cleared and now grows good hay. There is no vacant land in this vicinity.

Continuing from Temapho Lake, a wagon-road runs to Christie's meadow (Lot 3435). From here I ran a traverse-line to connect with my previous surveys in the Nazko Valley. Along this traverse I surveyed eight lots. The country is undulating and covered with second-growth jack-pine. Scattered among the jack-pine are depressions of various sizes covered with wild swamp-hay. The land between the swamp meadows is stony and of no use for agricultural purposes. A wagon-road connects Lot 3435 with the farthest of these meadows, which has been taken up by Mr. Christie. He has built a shack and barns and puts up hay here each year. Between Lot 3435 and the Nazko Valley there are approximately 850 acres of surveyed vacant land, all of which grows good wild hay and would be suitable for cattle-raising in a small way. This country lies at an elevation of 3,700 feet and is only suitable for cattle-raising. Good summer feed would be found near by in the Nazko Valley.

NAZKO VALLEY.

On completing my surveys around Aneko Creek I moved to the Nazko Valley, where I surveyed seven lots.

With the advent of the Pacific Great Eastern Railway, giving easy and cheap transportation to Quesnel, many intending settlers are now coming in to the Nazko Valley. Whilst up to last June no new places had been actually taken up, five different parties were met who were seeking homes in this part of the country. There is still much vacant land in this valley very suitable for cattle-raising in a small way.

The range along the valley is excellent and there is room for another 1,000 head of stock. The older settlers in this part of the country are prospering in spite of the slump in cattle prices.

Mr. Franklin, a local settler, has got out plans for the erection of a small sawmill to be operated by water-power from the Nazko River. The Harrington Bros., who are the largest land-holders in the valley, have just been joined by another brother, who has taken up a piece of land and has joined forces with his brothers in producing cattle.

I then traversed up Redwater Creek and surveyed two good quarter-sections on the way. These two quarter-sections are both mostly open and covered with good hay. At the present time cattle from the Nazko Valley graze here during the summer. The first of these two quarter-sections, Lot 9908, is locally known as Red Creek Basin. Its name is derived from its shape, which, with its gentle slopes, affords good early spring feed for cattle. At the head of this basin is a deposit of hematite, which I believe has been examined and reported upon by the Provincial Mineralogist.

While my party was completing the traverse to Redwater Lake, I was informed that "the largest meadow in the country" had just been discovered about 5 miles down the Baezaeko River from its junction with the Coglistico. I accompanied one of the settlers to this meadow and found it to be a long, narrow, S-shaped strip some 2 miles long, with an average width of not more than 10 chains. A tributary of the Baezaeko runs through it, cutting it up badly. Under the present system of surveys this piece could not be surveyed to advantage.

On completing the work in Redwater Creek Valley I moved by wagon to the Lower Baezaeko. A good wagon-road runs from the Nazko Valley, parallel to and some 2 miles south of the Black-

water River, to some hay meadows on the Baezaeko River. Two good parcels of bottom land were surveyed, which completed the survey of vacant agricultural land in this vicinity.

BAKER CREEK.

Leaving the Nazko, I travelled over the Nazko-Quesnel Wagon-road, which at this time (July) was in good condition and fit for a Ford car to travel over. On arriving at Puntataenkut Lake I turned south down a wagon-road which follows the western side of Baker Creek to some hay meadows about 5 miles from Tibble Creek. Two pieces were surveyed here, one of which has already been taken up by a settler in the neighbourhood.

From this point on I had to discard my wagon and use pack-horses. I procured these from the local settlers, who are mostly employed in raising horses and cattle. The settlement around Puntchesakut Lake, which is locally known as the Baker Creek Settlement, is going ahead rapidly. Three new families have settled in the locality during the last year and there are now sufficient children to start a school. With the aid of the Soldiers' Settlement Board, two families have bought herds of cattle and expect to make their fortunes in a few years' time.

On completing my first surveys on Baker Creek I crossed a low divide to Merston Creek and ran a traverse-line, connecting hay meadows up this creek to Tzenzaicut Lake. Three hay meadows were surveyed in this valley to the north of the lake and two parcels were surveyed at the east end of the lake.

The Merston Creek Valley is narrow, widening out in a few places, leaving natural-hay meadows in the bottom. Side-hills rise steeply from the valley to a height of 200 or 300 feet. These are thickly timbered with jack-pine growing up to 12 inches in diameter. In places a few spruce and poplar are found mingled with the jack-pine. Along the bottom of the valley a fringe of willows borders the creek on either side.

A large fire a few years back started on the west end of Tzenzaicut Lake and spread west to a distance of some 3 miles, completely cleared the country, and destroyed all the surface soil, leaving a bare and rocky country. A good trail follows Merston Creek to Tzenzaicut Lake; thence along the northern shore of the lake and continues on to Narcosli Creek, where it joins the Fraser River Wagon-road at McComb's place (Lot 9529). This trail was followed from the east end of the lake to Alexandria, and with the exception of land reserved for Indian lease, no unsurveyed agricultural land was seen.

Tzenzaicut Lake was triangulated and found to be 4 miles long, and not 9 miles as previously thought. It lies at an elevation of 3,675 feet and is much used by the Indians, who even come from as far as the Chilcotin to catch fish.

From Tzenzaicut Lake we retraced our steps down Merston Creek and found a trail leading through a low pass to Baker Creek, which we hit at the forks of Lot 9166. From here we had to cut a new trail for 3 miles up Baker Creek to join an old Indian trail from Quesnel to the Chilcotin. Along this trail I surveyed three good hay meadows on Baker Creek, and after crossing the Baker Creek-Narcosli Creek Divide, surveyed three more wild-hay meadows on the headwaters of Narcosli Creek. The country along this trail is covered with second-growth jack-pine, among which, in the depressions, are a few small pot-hole meadows and a few larger ones growing good swamp-hay.

UPPER NARCOSLI CREEK COUNTRY.

While my party was surveying the meadows on the headwaters of Narcosli Creek, I explored down an old trail which follows down Ramsey Creek. About 7 miles down the creek from Lot 9925 are two large swamps. There are evidently the two lakes shown on the old maps, the surfaces of which have been covered with decayed water-lily and other vegetation and has formed a muck surface. In years to come these swamps will grow grass and will eventually turn into wild-hay meadows. At the present time there is no land considered worth surveying down Ramsey Creek.

Another old trail runs from Lot 9925 over the Nazko watershed. This trail, on crossing the Nazko watershed, follows along a series of swamps and lakes, some 2 miles long, out of the end of which a creek runs in an easterly direction into Tautri Creek and thence to the Nazko.

There is considerable summer feed along this small valley, which widens out at the eastern end into a series of hay meadows; one of these, containing about 100 acres of open meadow

and lying about 3 miles south-east of Lot 352, has been cut during the past years by the Chilcotin Indians, who have done some fencing and have built a wagon-road into the meadow.

In this vicinity I saw about five parcels with a total of about 400 acres of swamp-hay meadow that I consider worth surveying. On the completion of my surveys on Ramsey Creek I traversed along another trail which took me south to Narcosli Creek and brought me out on the old Palmer Trail between Lots 9697 and 9696.

The country along the trail followed is undulating and rocky and some difficulty was encountered in finding sufficient feed for our horses. The country is covered with small jack-pine, and what few swamps there are amongst the timber were too soft for horses to graze upon. I surveyed two pieces on Narcosli Creek adjoining Lot 9697, around both of which I found innumerable staking-posts.

THE PALMER TRAIL.

Through these lots runs the old Palmer Trail, which now is little used except by Indians. It is blocked in many places by windfall, which would have to be cut out before pack-horses could use it.

Whilst my party was surveying here, I followed the old Palmer Trail to the west to what is marked on the maps as Taharti Lake. From Lot 9696 the trail follows up Narcosli Creek, passing through a stony, burned-over, jack-pine-covered country for some 3 miles, when it leaves Narcosli Creek Valley on the south and, heading slightly north of west, follows above the lake, which I believe to be Taharti Lake. This lake is about $2\frac{3}{4}$ miles long and $\frac{1}{2}$ mile wide; steep jack-pine-covered hills rise from its banks. At the east end of the lake is an open patch of approximately 100 acres, which in places grows a good crop of swamp-grass, and with drainage the whole piece could be made to yield a good crop of hay.

A creek runs in a westerly direction through this meadow and flows into Taharti Lake. At the west end of this lake is another large open flat, much used by the Indians for their camping-grounds while fishing. About 80 acres of this piece would grow good hay. A creek runs out of the west end of Taharti Lake and, flowing through a series of long, narrow lakes, runs into Tautri Creek. On all the old maps the water is incorrectly shown flowing in the opposite direction. I saw in this neighbourhood about 300 acres of wild-hay land worth surveying.

On completing my work on Narcosli Creek I ran a tie-line to connect the Narcosli Creek surveys with the surveys already made in the Fraser River Valley. In this connection I was obliged to cut about 8 miles of new trail from a point on the old Palmer Trail some 3 miles north-east of Lot 9697 to Lot 9491. This pack-trail will be of great benefit to the few settlers who have taken up land on Upper Narcosli Creek, saving them half a day's travel from the settlements in the Fraser Valley. Along this trail no new land fit for agriculture or hay was seen.

The Upper Narcosli Creek country, lying as it does at an elevation of approximately 3,550 feet above sea-level, is of no use for agriculture, but is a very good country for hay. Some of the larger meadows have been taken up, but there are still many small meadows worth cutting.

EXTRACTS FROM THE REPORT OF J. F. CAMPBELL.

DATED SEPTEMBER 15TH, 1922.

[Mr. Campbell was employed in 1922 by the British Columbia Government in making surveys in miscellaneous parts of the Cariboo District in the vicinity of the Canadian National Railway.]

WEST OF PRINCE GEORGE.

The country west from Prince George and paralleling the Nechako River is essentially a farming district and is usually classed by agriculturists as a mixed-farming country. There is a certain amount of timber that can be profitably utilized for milling purposes, but the areas available are so scattered that I doubt if the timber would be of much value unless it is cut for local use. In the few places where the timber is of commercial value it is generally spruce and Douglas fir. The principal growth, however, is poplar, which is by far the most abundant, lodgepole pine, spruce, balsam, birch, and a few scattered patches of tamarack in some of the swamps. Willow and alder grow along the streams and borders of lakes, and often a scattered

growth of willow is on the hillsides. Nowhere does the timber reach any great size, the poplar varying from saplings up to 8 inches. The spruce would average a little larger, but is scattered and usually found in swampy depressions or close to water.

On most quarter-sections there is usually some fairly open land that the settler can clear up the first year, gradually extending his clearing to the more heavily timbered land. It is noticeable in clearing land that if the trees are felled in summer when the sap is in the upper limbs, the stumps, and especially the poplar, will rot in a few years and can be easily removed, but in many instances the felling is done in winter when the sap is down, making the removal of the stumps much more difficult, as they do not rot as readily.

The actual valley of the Nechako for 50 miles west from Prince George is not wide, seldom exceeding 2 miles, and is usually less than that distance. But the low bench lands adjoining the river are generally called valley lands and there is little difference between the bottom land and the land on the lower benches. The soil on the bench is usually a brown clay silt, while lower in the valley it is a little lighter, with a mixture of fine sand. Both soils have vegetable mould on top and support a good growth of peavine, vetch, and wild grass. In many places the peavine and vetch attain a height of 2 or 3 feet, with creepers twice that length. In the meadows the wild grass, especially red-top, grows to 5 feet and is very dense. Where the soil has been cultivated timothy yields an excellent crop, and from what different farmers have told me I should say that timothy varies between 2 and 4 tons per acre. Oats and barley seem to do well, but I have not seen any wheat fully ripened, although I understand that farther west wheat is a success. Vegetables are something that can be depended upon, and I do not know of a year in which a failure has been reported, although this year in some localities the potatoes were touched by frost early in June. This, however, is an exception; although there are occasional summer frosts in May and June, they generally are not severe enough to do any damage.

There is plenty of range for cattle in summer and a great abundance of wild feed. In winter the stock requires to be fed, as the snowfall is too heavy for them to range out. The length of the winter is variable. Some winters snow may not fall until well on in December and be off the ground by the end of March, while other winters the snow may come late in October and stay until early in April. For this reason it is advisable to have feed for cattle for at least five months. The country is peculiar in its snowfall owing to the fact that the depth varies in very short distances, and it is difficult to place the average snowfall for the whole district. I should think it would run between 2 and 4 feet, some parts being possibly a little deeper in a winter of heavy snows. The rainfall in summer can be depended upon, the average from June until September, inclusive, being 1.50 inches per month, with the lightest rainfall in September. The temperature for these four months would average 56° F., with August the hottest month. The average mean temperature for the winter months is about 22° F. Both the rainfall and temperature is averaged over three years.

The Grand Trunk Pacific Railway follows the Nechako River on the south bank. Wagon-roads parallel the river a few miles back on either side, with cross-roads running to the railway. To the south of the river the cross-roads go to the railway-stations, while on the north bank there is usually a ferry or small boat to cross the river to the railway. More ferries are required on the Nechako and these are being installed as traffic warrants them.

Many new settlers have located during the past few years, the majority being either from the Prairie Provinces or the United States. Some have brought live stock and farm implements from their former homes and expect to make permanent homes on their new locations.

EAST OF PRINCE GEORGE.

The country east of Prince George for about 100 miles, and paralleling the Grand Trunk Pacific Railway, is at present, with the exception of small areas, more adapted to the lumbering industry than to farming. This does not apply to the west side of the Fraser River on the stretch from Prince George to where the river bends to the east, a distance of about 40 miles. There is a vast extent of land to the west that has at one time been subjected to a severe fire and the present growth is principally small poplar and willow. The land is easily cleared and quickly brought under cultivation, and there are many excellent farms in operation. The country in that vicinity is more generally referred to as the Salmon River lands, upon which I reported some years ago.

I resurveyed three sections, Lots 815, 816, and 760A, on the west bank of the Fraser, opposite Shelley, on the Grand Trunk Pacific Railway. The majority of the land is bottom land with a deep rich soil. The growth of peavine and wild grass is heavy and the clearing of the poplar, willow, and cottonwood fairly light. It is, however, rather badly cut up by what is known as the Goose Country Slough, and I should think that a large part of the land adjacent to the river and the slough would flood at high water. This is especially true of the southern half of Lot 760A and part of Lot 816.

On completion of this survey I moved to Newlands, where a pre-emption and a small tract of vacant land was surveyed.

Newlands is on the Grand Trunk Pacific, 30 miles east of Prince George. It lies in the centre of a long, narrow valley that has very fertile soil. This valley, evidently an old lake depression, extends from the Fraser River, at the mouth of the Willow, east for 25 miles, where the Fraser River is again reached. The Grand Trunk Pacific follows the valley and there are five stations in the 25-mile stretch—Willow River, Giscome, Newlands, Aleza Lake, and Hansard. The valley at one time had a very heavy growth of large fir, spruce, and balsam, but a large part of the timber adjacent to the railway, and especially in the vicinity of Newlands, has been logged off and the land brought under cultivation. There are still large tracts of timber available for milling purposes, notably near Eaglet Lake and Aleza Lake, and it will be many years before the timber is exhausted.

The land fit for cultivation is principally bottom land, the soil being a deep rich black loam. The most successful crops are timothy-hay, oats, and vegetables. The best stand of timothy and oats I have seen this year was growing on the land adjoining that surveyed. This has been a year of light rainfall, but even with this lack of moisture the crops in this valley appear to be quite up to normal.

Most of the farmers have gone into mixed farming and success is attending their venture. On the farm of W. P. Ogilvie, a mile east of Newlands, there is possibly 20 acres under cultivation, and from four to six men with teams have been employed during the past summer clearing and making ready for the plough additional land. One of the best and most modern barns has been built on this farm and a silo is in the process of construction. On the farm adjoining this to the south there are 30 acres under hay and oats. Opposite Newlands Station is the farm of J. Keenan, from which the heavy timber has been cleared, and excellent crops of hay, oats, and strawberries are raised. The strawberries from this farm will stand comparison, both for quality and profusion of growth, with points in British Columbia that specialize entirely in berries. There are many other farms in the valley that are successful, and in the older-settled parts near the mouth of the Willow River the amount of land under cultivation is quite extensive.

There are five sawmills in the valley, the one at Giscome being the largest in Central British Columbia, with a cut of over 100,000 feet per day and employing a few hundred men. At the eastern end of the valley, near Hansard, there is a lime-deposit and a plant is under construction for the mining and burning of lime.

The snowfall in winter is heavy and cattle have to be fed about five months. The rainfall is, from indications, heavier than west of Prince George, and I should judge that the snowfall is also deeper.

NESS LAKE.

Ness Lake is about 20 miles west from Prince George and 10 miles north of the Nechako River. Two sections near the east end of the lake, Lots 971 and 972, were subdivided into 160-acre blocks. About a quarter of the land is an old beaver meadow that has been under water for many years. A large amount of ditching has been undertaken by the settlers and the majority of the land is drained and will shortly be fit for cultivation. The settlers, who are farmers from the Western States, have seen the same class of land under cultivation, and claim that no better land is wanted if properly drained and cultivated. Only a few acres have been seeded this year and the results obtained so far have been very promising. There are large tracts of similar land, often mistaken for muskeg, in British Columbia, and I am sure, if similar methods of reclaiming were used, these tracts, at present considered worthless, would soon be producing crops.

The land in the vicinity of Ness Lake is being settled very rapidly by energetic farmers and within a few years should be one of the best producing areas in the Fort George District. Most

of the settlers have substantial buildings and areas under cultivation varying from 2 to 20 acres. The crops raised are those usual throughout the district—timothy-hay, oats, potatoes, berries, etc.

The road from Prince George to Ness Lake passes along the north boundary of Lot 972, while 3 miles to the south is a road to Miworth, on the Grand Trunk Pacific Railway. These roads have been connected by the settlers with a good road along the west boundaries of Lots 972 and 971. Miworth, the nearest railway-station, is 10 miles distant, and at that point a Government-operated ferry is on the Nechako River.

CHIEF LAKE.

About 20 miles to the north-west of Prince George are three lakes that lie within a mile or so of one another—Nukko Lake, Swamp Lake, and Chief Lake, of which Chief Lake is the largest. The area surrounding these lakes is known locally as the Chief Lake District, and for the past few years the area of land under cultivation has been steadily increasing. This is due to the excellent quality of the soil, a market at Prince George within a day's travel, and convenient roads. Adjoining Swamp Lake, which is the southernmost of the three lakes mentioned, and extending south-east, are seventeen sections that have reverted under the "Soldiers' Homestead Act." These were subdivided into 160-acre blocks.

The land in the vicinity of Chief Lake, in common with the rest of Northern British Columbia, had at one time been covered with large spruce and Douglas fir, but with the exception of a few hundred acres near Swamp Lake and Nukko Lake, which still have the original growth, the prevalent timber is poplar, spruce, and lodgepole pine. The poplar seldom exceeds 10 inches in diameter, the average size probably being about 4 inches, while the spruce and pine would average considerably less. The clearing of the timber would not be heavy, but there is very little land that could be cultivated until clearing is undertaken. There are a few beaver meadows, often erroneously termed muskeg, that could be drained and the surface moss burnt off and put under cultivation. These will usually produce a good crop of hay the first or second year, but unless thoroughly dry will not produce good vegetables.

The land lies on a low divide between the Nechako and Salmon Rivers and is well watered by numerous creeks that have their sources in the many small lakes that dot the country. The soil is clay with a small mixture of sand and varies in depth from 3 feet and greater. Below this soil is clay, in places intermixed with light gravel.

The area is well supplied with roads, the main Chief Lake Road passing north-west through the block surveyed, while two other roads branch from the main road, one passing along the southern limit of the block, while the other parallels the land to the east. Both the last-mentioned roads are in fair shape for team and wagon. I hauled 2,000 lb. from near the centre of the block to Ness Lake along the road that passes through the southern part of the block and had no trouble in making $2\frac{1}{2}$ miles an hour. Motor-cars can be used for about 15 miles on the Chief Lake Road, and after some repairs are made to the bridges there should be no trouble in motoring from Prince George to the lake.

There is a post-office and school at Chief Lake, but as the land surveyed lies midway between Chief Lake and Prince George, the latter would be more convenient for the settlers on this particular block.

AVERIL CREEK.

Averil Creek empties into the Fraser within a mile of where the river turns south after reaching its most northern point. A range of hills standing about 2,000 feet above the river turns the Fraser south, and Averil Creek comes through a narrow canyon in the same range. For a mile north along the creek there is a series of canyons, then the creek-valley widens into a basin $\frac{3}{4}$ mile wide and $1\frac{1}{2}$ miles long. The land in this basin is very open, almost prairie-like in aspect. On all sides hills rise above the basin or valley for 2,000 feet, and for the most part are heavily timbered with spruce, fir, and balsam, although there are occasional patches that have been swept by fire and have a dense growth of mountain-ash and willow. The land in this valley was surveyed into small holdings.

There are two mines in the vicinity of Averil Creek. Both these have a number of men employed, and it is for those who may be employed at the mines and decide to locate that the land was surveyed, as the position nullifies it for settlement except for those immediately interested in the mining development.

On the mine operated by the North Point Mining Company three tunnels have been driven into the hill. The tunnel upon which most of the work is at present concentrated is about 700 feet long and has been driven through solid rock. Silver and lead are in paying quantities and there is also a small amount of gold. Most of the work done so far is in the vicinity of Lot 9606, about a mile west of Averil Creek. On Averil Creek, half a mile from the mouth, there is another mine under way, and although the work and development is not as large as on the North Point Company's property the showing is considered to be as good. About thirty claims have been staked and a certain amount of work has been done on a few of them. J. D. Galloway, the Resident Mining Engineer for the district, visited the properties while I was camped at Averil Creek, and no doubt his report on this group of mines will be published in this year's Annual Report of the Minister of Mines. Also parties from the East who are interested in the development of the property paid short visits and evidently were well satisfied with the outlook.

Averil Creek is 12 miles north of the Grand Trunk Pacific Railway, but as there is no road connection all supplies have to be brought down the Fraser River from Hansard, a station on the railway, 40 miles up-stream.

CANOE RIVER.

The Canoe River has its source at a glacier in the Selkirk Range, about 15 miles west of Cranberry Lake, a short distance south-west of Mount Robson Park. Swinging in a horse-shoe bend, it empties into the Columbia near the big bend of that river. The low divide that separates the watersheds of the Fraser and Columbia is between Cranberry Lake and Canoe River, the distance between those two points being about $1\frac{1}{2}$ miles. The Canadian National Railway follows along this divide where it passes from one watershed to the other.

The Canoe River flows through a narrow valley on either side of which rise snow-capped mountains. In many instances the mountains rise abruptly from the valley-floor without any intervening slope. The height of the mountains varies from 7,000 to 9,000 feet, with a few of the peaks higher. The scenery is similar to that in Mount Robson Park, a few miles to the north, and I have no doubt that as soon as the country is better known to tourists and connected by good motor-roads to the Prairie and Coast cities, the valley will be one of the most favoured in British Columbia. Fifteen miles down the valley from the Canadian National Railways are a number of hot springs that I would liked to have visited, but the short time at my disposal prevented this.

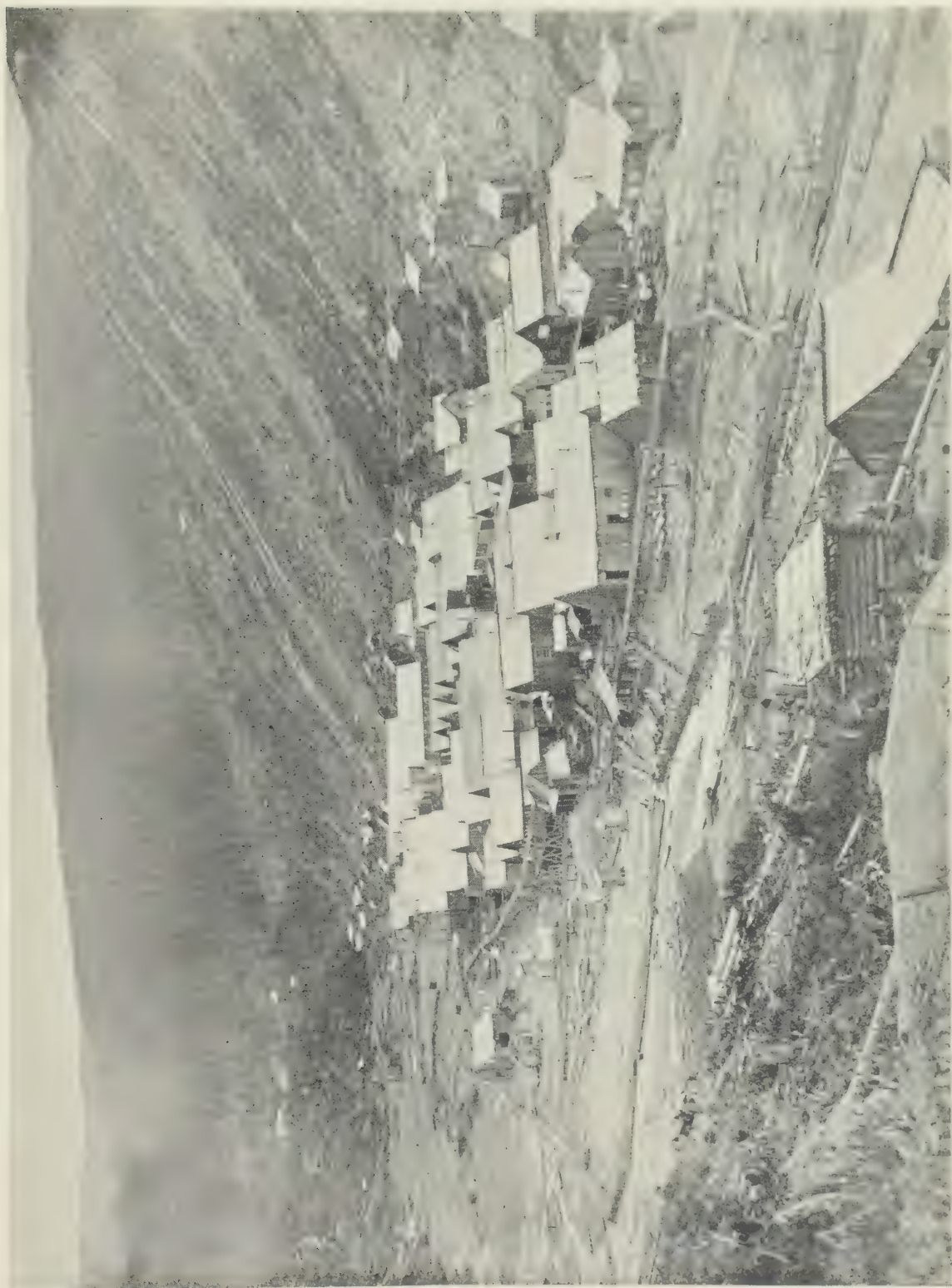
A large number of farms are under cultivation both in the Canoe River Valley and the valley of the McLennan River, a few miles north. Some of the farms have 40 and more acres under cultivation and the usual crops of hay, oats, vegetables, berries, etc., are raised. Irrigation is used on many of the farms, this being necessary as the rainfall is light. Most of the water for irrigation purposes is obtained by diverting one of the numerous mountain streams and running it in ditches through the farm. When sufficient water is obtained the stream is turned back into its usual channel.

Some of the streams are large in size, notably Swift Creek and Packsaddle Creek, both being about 100 feet in width and carrying a large flow of water. A mill in operation on Swift Creek uses a water-turbine which is driven by an overflow from the creek. Some of the settlers have water-wheels on their farms and obtain enough power to drive small saws for the cutting of firewood.

The snowfall in the valley is light, seldom exceeding 2 feet, and the cattle feed out nearly all winter, though I noticed that all farms put up enough feed for a few months in case a severe winter develops. There are some fairly large herds of cattle in the valley and many flocks of sheep and all appear to be in first-class shape.

LUMBERING.

The lumbering industry in the Fort George District has been dormant for a number of years, but is now beginning to pick up. There are vast areas of timber close to the railway to draw from, but for the past two years the low price of lumber in the market has prevented any large cut, and most of the mills have been closed or working part time. During the past summer most of the mills have started cutting again and the majority will continue logging operations this winter. The Giscome mill, the largest in Northern British Columbia, has been idle for five years, but this summer has started cutting and logging. Other mills have started and a few new mills have been constructed.



OLD BARKERVILLE BEFORE THE FIRE.

GAME AND FISH.

Game is very plentiful throughout the district. The moose are numerous and it takes very little skill or time to find and kill one. Many were seen during the summer, but none were killed by members of the party, as they were generally encountered in out-of-the-way places. At both Averil Creek and Canoe River there were many indications of grizzly bear, but none were seen. The black bear are plentiful, but are more destructive to farm gardens than harmful to man, although two members of the party had an unpleasant experience with one, which necessitated the use of the axe. A few mountain-sheep were seen on the higher peaks in the vicinity of Canoe River. Fish are plentiful in most lakes and streams, rainbow trout predominating, and it is not difficult to make a good catch.

EXTRACTS FROM THE REPORT OF R. W. HAGGEN.

DATED OCTOBER 24TH, 1922.

[Mr. Haggen was employed in 1922 by the British Columbia Government in making surveys in the vicinities of Barkerville, Van Winkle, and Cottonwood.]

INDIANPOINT AND ISAACS LAKE.

At the outlet of Indianpoint Lake there is a small open flat which grows good hay; potatoes mature and gardens do well; however, in common with most pre-emptions in the Barkerville section, the area of agricultural land would be insufficient to support any one who had no other means of earning a livelihood. There is little market for produce, but the settlers usually raise produce and horse-feed for themselves; sell a little, and earn a livelihood by a happy combination of farming, trapping, and guiding.

Pre-emptions were also surveyed 7 miles and 14 miles north-easterly along the old trail, one being on the portage between Indianpoint and Isaacs Lake and the other on Isaacs Lake at the mouth of Wolverine Creek. The holders of these pre-emptions had all enlisted.

The two last-mentioned pre-emptions can hardly be classed as agricultural land; they are densely wooded with hemlock, spruce, cedar, and fir, and cost of clearing would be above any possible value as agricultural land; the soil is sandy, rather lacking in nutrition, and transportation conditions are unfavourable. However, garden-patches are fairly productive and the lands lie in a good trapping country.

TIMBER.

While the agricultural land in this locality may not be a great asset, there is a tremendous body of virgin timber in the locality. Tributary to Bowron River, that is on Bowron and Indianpoint Lakes, a common average is from 5,000 to 10,000 feet of spruce to the acre. On the streams and lakes tributary to the Quesnel River, the area including Isaacs Lake, the North Fork of Quesnel River, Quesnel Lake, and Horsefly River, the Commission of Conservation of Canada gives the quantity as 5,736,000,000 feet B.M., the approximate percentages being: Spruce, 40 per cent.; red cedar, 30 per cent.; hemlock, 10 per cent.; balsam, 15 per cent.; Douglas fir, 3 per cent.; and lodgepole pine, 2 per cent. This timber is all available for floating, by river, to Quesnel when conditions warrant its development.

I have neither seen nor had any authentic information concerning any minerals in this section; at a few bars on Bowron River some placer-mining has been done.

CUNNINGHAM PASS.

A traverse was made from the Waverly Mine on Grouse Creek to the mouth of Cunningham Pass Creek at Cunningham Creek.

A road leads all the way from Barkerville, the 5-Mile post being at the easterly boundary of the Waverly ground and 12-Mile at Cunningham Creek.

From the Waverly the road descends into Antler Creek Valley, which is followed for 3 miles; at the lower end of the Nason ground the road forks, one branch continuing up Antler

Valley to Sawmill Flat, where it connects with the Keithley trail; this section of Antler Creek was very rich, yielding some \$8,000,000 in the days of the gold-rush. At the Nason claim the ground becomes deeper and wet and drifting was impracticable. At the Nason ground there is a little flat leading through to Cunningham Pass Creek, and good results were obtained by prospectors there this season. It is known as Whisky Flat, and there are a number of old cabins still in existence there; it must have been a popular residential quarter once. The Cunningham Pass Road leads through a low pass from Antler, Whisky Flat entering the pass at the Yellow Lion claim, half a mile from the forks. From the Yellow Lion the drainage of the pass is to Cunningham Creek, a tributary of Quesnel River.

The valley of Cunningham Pass Creek, and of Cunningham Creek as far as was visible, has been fire-swept and is now wooded with poplar, growing among the *brulé*. There would seem to have been little mining done on the creek, though prospectors who worked there this summer got very promising results. One company had a drill in operation at the junction of Cunningham Pass and Cunningham Creeks, while House and Reid, of Barkerville, are busy this fall setting up a hydraulic plant to operate on a bench of Cunningham Creek next season. Cunningham Creek was a fairly good producer and was worked until quite recently with good results. Of course, no information is available as to the prospects found by the drill.

VAN WINKLE TO SWIFT RIVER.

From Van Winkle, on the Cariboo Road, 44 miles from Quesnel and 14 from Barkerville, a traverse was run over a road which follows up Last Chance Creek, crosses the head of Peters Creek, and follows down the valley of Fountain Creek to Swift River, a tributary of the Cottonwood. A pre-emption had been taken up by a returned soldier and covered some hay meadow and open hills near the Swift River.

In this section there is considerable good land and a luxuriant growth of summer feed. At some future date there will be a settlement between the Quesnel River and Fountain Creek; at the present time it is too remote for settlers to make a success there. The district is evidently quite well adapted to dairying and mixed farming; the winters are of too long duration for cattle to be raised profitably. While a surveyor can do no more than express an opinion of virgin country, it would seem reasonable to expect that splendid hay-crops could be grown, that hardier root-crops would do well, and that potatoes could be grown on the slopes; the depressions would probably be subject to frost. Under present conditions the land is 60 miles from railway; under the best conditions, say a road in a fairly direct line to Quesnel, it could hardly be less than 40 miles, and under present conditions in the district settlers would be well advised to locate nearer the railway.

There is gold on all the creeks in this section, though it is hardly rich enough for individual miners to make profit. There is a probability of good dredging-ground, and one company proposes the installation of a dredge next season on ground which was drilled this year.

AHBAU LAKE TRAIL.

From Cottonwood Post-office, on the Barkerville Road, a tie was run along the old trail to Ahbau Lake. Along this section there are numerous pine ridges, with swampy ground, wooded with spruce, intervening. The section contains no agricultural land; in fact, it is difficult for horses to find feed within 6 miles of Ahbau Lake. Transportation conditions now preclude any value attaching to the timber, but it may ultimately become of value. Some mining has been done on Graveyard Creek, the miners making wages; a quartz ledge beyond Ahbau Lake a few miles is reported to contain a good deposit of galena and it has recently been examined by engineers.

Graveyard Creek, draining out of Ahbau Lake, is the North Fork of Cottonwood River, entering the latter stream below the Pacific Great Eastern Crossing, the course being generally westerly.

COTTONWOOD RIVER.

The Cottonwood River, which flows in a valley 500 to 800 feet deep, was traversed from the Barkerville Road (Cottonwood Post-office) to near the Pacific Great Eastern Crossing.

The valley does not greatly belie its name, there being numerous benches lightly wooded with aspen. These benches are narrow and gravelly and do not appear to be very well adapted

for agriculture. The lower flats and uplands are wooded with a fairly heavy growth of pine and spruce. A few of these lower flats would be suitable for agriculture on a limited scale, and undoubtedly root-crops would do well, while hay can be raised without irrigation. There is little or no range land in the valley and it could not be considered suitable for stock-raising.

Between 10 and 11 miles from Cottonwood Post-office the river flows through a canyon, the walls of which were so rugged that it was necessary to swing the traverse back a considerable distance; this canyon is half a mile in length, terminating in falls some 10 feet high.

From 16½ miles the stream enters a series of canyons, the last of which is at the crossing of the Quesnel-Fort George Road, 8 miles from the head of the canyon. Several of these canyons are quite impassable near the river for a man on foot.

The top gravels along the Cottonwood Valley are all auriferous and in some places carry values of several dollars per yard. It seems very likely that men with rockers could average from \$4 to \$7 per day for wages. The gravels are rather richer than those of the Quesnel and Fraser Rivers, on both of which considerable work of this kind has been done. Drilling was done on one section of the river at the head of the 8-Mile Canyon.

BEEDY CREEK.

One parcel was surveyed on Beedy Creek, a tributary of the Beaver River, which drains into the Quesnel River 30 miles from Quesnel. This parcel lies 11 miles by road and trail from the mouth of the Beaver, and also has access from a road 12 miles in length from McInnes's ranch on the Beaver Lake-Alexandria Road. McInnes's place is 20 miles by road from Macalister Siding, on the Pacific Great Eastern Railway.

The Beedy Creek Valley contains some rich bottom land and good crops are raised; owing to its position the activities of the settlers are pretty well confined to stock-raising, and with beef selling at a price below cost of production, except under the most favourable conditions, their position to-day is not good. This valley, in conjunction with the Beaver Lake District, will probably develop into a dairying and mixed-farming section in a very short time. The creamery at Quesnel is now an assured success, and cream is being shipped in from points down the railway as far south as Forest Grove; it will be necessary for the settlers in the Beaver Lake section to have some arrangement among themselves for the delivering of cream to the railway. When the district does make development along these lines it will be one of the most prosperous farming sections in the Province.

GENERAL.

Conditions in the district during the past year have not been good, though there has been little unemployment. Those settlers who have dairy stock are making a living. The stock industry is at a standstill owing to its low prices. A sawmill has operated at Quesnel throughout the season. The mining industry has been more active than usual, a number of men being in the hills prospecting. The Penobscott claim on Cedar Creek has been a good producer all year, and the Kitchener Mine on Keithley Creek should show good return. It will be rather strange if other workable ground is not struck in the Cedar Creek area in the near future, as it seems unlikely that rich ground will be found in one spot and nothing of much value elsewhere in the locality—rather contrary to placer experience.

Generally I see no reason for pessimism in regard to the future of the Cariboo and Lillooet Districts. They contain a large aggregate area of very productive agricultural land, with abundant summer range, and both districts are well adapted to mixed farming. Pulp-milling, tie and pole timber are to be found in large quantities, and given favourable transportation conditions the timber industry is bound to develop. Placer-mining will continue to be carried on for a number of years and quartz prospects are encouraging. The non-metallic mines will produce soda, magnesite, and epsomite as required; they will probably continue to work intermittently as market conditions warrant.

Climatically the Cariboo District is not one subject to extremes. The depth of snow varies from 1½ to 3 feet in winter; the winters are usually pleasant, with occasional cold snaps, but comparatively little wind; in summer extreme heat is unusual, 80° to 90° being the extreme. There is usually ample rain during the summer to ensure good crops, though, as is common to all countries, there is occasionally a long dry spell.

EXTRACTS FROM THE REPORT OF W. C. MERSTON.

DATED NOVEMBER 1ST, 1922.

[Mr. Merston was employed in 1922 by the British Columbia Government in making surveys in the Chilcotin Valley.]

BEECHER'S PRAIRIE.

My first work took me through a country locally known as Beecher's Prairie. Here thousands of cattle graze all summer on open lands dotted with small lakes and scattered poplar. This country was surveyed into townships some years ago and put under reserve to be used as a common grazing area by cattle-ranchers in the vicinity. A large portion has been set aside for a military area, and in days to come should be a valuable asset to the Dominion Government.

On completing my first ties we travelled westerly across the open prairie to the Stack Valley Road, then followed up this to Shell Creek and on up Mackin Creek, where five old surveys were seen tied together. There are several settlers along the Stack Valley Road who appear to be doing well with small bands of cattle. The meadows covered by surveys up Mackin Creek have been taken up by a rancher named McRae, who has built wagon-roads to connect his various holdings, and this year has constructed a new road from his pre-emption (Lot 5780) to some meadows he has purchased on Narcosli Creek. The country along McRae's Wagon-road between Callanan Lake and Narcosli Creek is very stony and, with the exception of many small scattered meadows, is valueless. I estimated that between Lots 182 and 5780 there are approximately 640 acres of good meadow land which, if surveyed, will one of these days be taken up. At present these surveyed meadows are being used by McRae. The cattle in this vicinity had a hard time last winter and in one spot twelve carcasses were seen lying together. A large brown bear had made this place his headquarters and was living on the dead meat.

MACKIN CREEK.

On completing the ties of McRae's meadows we moved to the Straus meadows (Lot 179), and then ran a tie-line connecting this meadow with Moon's meadows (Lot 383) on Mackin Creek. The wagon-road joining these meadows follows up the South Fork of Riske Creek, which flows through a narrow gorge with steep jack-pine-covered side-hills for about 3 miles, then climbs about 200 feet in half a mile to Mackin Creek.

The local Indians have constructed a dam across Mackin Creek and divert water into the South Fork of Riske Creek by means of a ditch about half a mile long. They take water out of the South Fork of Riske Creek again at the Toosey Indian Reserve No. 2 and use it to irrigate their lands. All the good land around here has been alienated and there is no land worth surveying in this vicinity.

RAVEN LAKE.

Some 4 miles south-east of Moon's meadows (Lot 383) and across a range of hills are a group of surveys covering Durrell's meadows. A good wagon-road connects these and runs in a south-eastern direction to the main Chilcotin Road at Harpers Lake. I connected these meadows by tie-line and at the same time traversed part of the westerly shore of Raven Lake. The lake lies at an elevation of approximately 4,000 feet: it is a mile wide and three-quarters of a mile long. No streams could be found either entering or leaving the lake, which must be fed by underground springs and snow-water. The general lake-level is slowly sinking and in years to come the lake-bottom will turn into a wild-hay meadow.

The group of meadows around Raven Lake are all wild swamp-hay meadows surrounded by small jack-pine-covered land which is valueless for agriculture. On completing my ties here, I moved back to main Chilcotin Wagon-road and then on through Hanceville and Alexis Creek up the Chilcotin River as far as the Siwash Bridge.

NEWTON'S WAGON-ROAD.

The road across the Chilcotin at the Siwash Bridge has fallen in and some difficulty was experienced in getting my wagon across the river.

Mr. Newton, an old-time rancher, has built a good wagon-road from the Siwash Bridge to his hay meadow near the Nemiah Valley Road. The road leaves the Chilcotin River and climbs about 900 feet to the general level of the surrounding country, which about here is approximately

3,000 feet, then runs 23 miles due south through small jack-pine-covered land. The soil is very rocky and with the exception of two small pot-holes there is no water or horse-feed along the road. The people who use the road make the drive from Newton's meadows to the Chilcotin River in one day. About a mile to the west of Newton's meadow is a bare hill rising some 300 feet above the level of the surrounding country and locally known as Newton's Mountain. On the top of the hill Newton has staked a mineral claim and has done some development-work, taking out ore containing gold, silver, and copper. The claim has not been sufficiently developed to give any idea of its future value.

From Newton's meadow a new wagon-road has lately been constructed by Indians, giving access to the Nemiah Valley Road, which runs from Hanceville to Taseko Crossing and then on into the Nemiah Valley. The road is not very good, but passable by a Ford car. All the meadows along this road have been taken up and the few isolated patches of dry open land seen were not considered worth surveying.

ANAHIM CREEK.

My next work took me to Macaulay's meadows on the South Fork of Anahim Creek. The best of the land in this valley has been taken up for some years, but there are one or two open flats, in all about 640 acres, which I consider worth surveying.

The South Fork of Anahim Creek is a small stream sunk about 20 feet below the level of the surrounding jack-pine-covered country. At the head of the South Fork of Anahim Creek is a large level swamp which with draining could be turned into good hay land. Macaulay used to cut hay here, but has not used it lately. All the meadows in this vicinity are fenced, with the fences built well outside the survey-lines on Government land. The Indians know this and make a habit of leaving gates open and bars down so their cattle and horses can get feed. This summer several meadows were completely spoiled in this manner and no hay could be cut on them.

PELICAN LAKE.

From one of Macaulay's meadows, Lot 148, a wagon-road runs to the north-east. I followed it up for a distance of about 12 miles and came to a large lake not shown on any map, but locally known as Pelican Lake. I estimated this to be about 4 miles long and in places 2 miles wide. There are two small islands in the lake which were covered with pelican and in the distance looked like white ships in full sail. This lake, although containing no fish, but heaps of frogs, is the headquarters of the pelican for the whole of this part of the country. Flights were seen leaving Pelican Lake daily, travelling north to the Nazko and west to Chezacut Lake.

Both to the north and to the east of Pelican Lake are extensive hay meadows used by the Indians. On one meadow alone are 640 acres of level land on which more than twelve large haystacks were counted. In this vicinity I estimated there are about 2,000 acres of hay lands worth surveying. The drawback to this country is that it lies at an elevation of about 3,800 feet and would be very difficult to irrigate. Pelican Lake derives its water almost entirely from the winter snow, and if used for irrigation purposes would soon dry up, as there are no streams either entering or leaving the lake. A good wagon-road runs along the east shore and continues about 4 miles to the north of the lake, running through and joining up hay meadows.

The Indians from the Anahim Indian Reserve seem to look on these meadows as an extra Indian reserve. No Indian leases or application for leases appear to cover any of the meadows in this vicinity, and the sooner these lands are surveyed, the less chance will there be of friction at some future date with the Indians. I spoke to several families who were cutting hay and told them that most likely the Government would survey these lands next year. No objections were raised.

UPPER ALEXIS CREEK.

On completing my work around Pelican Lake, we moved up Alexis Creek and on to Bell Creek, where I surveyed a pre-emption belonging to an old-timer called Bayliff. The wagon-road from Alexis Creek Road to Bell Creek was the roughest piece that I encountered this summer or that I have ever encountered. Indians will not take a wagon over this road without extra pay, and Bayliff has never been known to get to his meadow without breaking a wheel or a king-pin. We were comparatively lucky and escaped with a broken queen-rod.

There are six surveys on Bell Creek covering good hay meadows. Between these surveys are small pot-holes which also grow good hay and have been cut in the past when hay was scarce.

Moving on up Alexis Creek, past Alexis Lake, we followed a fairly good wagon-road past Morgan's place (Lot 4837) and on to a pre-emption taken up by John Maindley. I surveyed two parcels here. The land is not much good and only a few acres of the parcels I surveyed will grow even hay. Maindley appears to have taken up these two pieces to be in the vicinity of his friends rather than for the agricultural possibilities of the land. There are several small unsurveyed meadows around here which I did not have time to survey this season.

TAUTRI LAKES.

I picked up my last six weeks' food-supplies at Tom Lee's store at Alexis Creek and moved up to the Isaac meadow (Lot 531). I then ran a tie-line from the Spring meadow (Lot 8342) through to Martin's half-way meadow (Lot 554) and on to Martin's far meadow (Lot 352).

About 4 miles south of Martin's half-way meadow a wagon-road passes an old cabin and barn built near Tautri Lake by Long Johnny. I triangulated Tautri Lake and found the three sheets of water to be about 7 miles long and not more than a quarter of a mile wide. The water is very shallow and will eventually dry up from the accumulation of decaying vegetable matter. Some years ago these lakes were comparatively deep, now it is hard to float a raft on them, and in years to come they will turn into wild swamp-hay meadows.

Along the north side of Tautri Lake runs a good pack-trail to McComb's meadow (Lot 9696) on Narcosli Creek and then on to McRae's meadows (Lot 9697). At the end of these meadows is a small lake that corresponds to the lake that Lieutenant Palmer marked on his old maps as Taharti Lake. It is probable that McRae's meadows were at one time part of this lake, which would then correspond very closely to the size and shape of Taharti Lake as shown on the old maps. According to the Indians, there is no other lake anywhere in this vicinity that could correspond at all with Palmer's Taharti Lake.

At the west end of Tautri Lake there are about 40 acres of land worth surveying. About 6 miles to the north of Tautri Lake I surveyed four parcels of good hay meadow which I found last year. Indians at one time or another have built a wagon-road into these meadows and put up a small quantity of hay. One large meadow containing approximately 320 acres of open land would require draining before any hay could be cut. The lie of the land is suitable for easy and cheap drainage.

GAME.

I saw more game this summer than I have seen during the past three seasons. Willow and Franklin grouse were very plentiful and made a welcome change to our usual diet of pork and beans. Prairie-chickens are not allowed to be shot this season and are multiplying very quickly. Several coveys containing from twenty to thirty birds were seen on the open lands north of Alexis Creek. About 10 miles north of Alexis Creek mule-deer are plentiful, and the Indians, with dogs, have no difficulty in getting one any time they wish. Moose are on the increase; fresh tracks were seen almost daily. With the hard winter last season and consequent death of many cattle the brown bear were numerous.

EXTRACTS FROM THE REPORT OF A. O. WHEELER.

DATED DECEMBER 31ST, 1922.

[Mr. Wheeler was employed in 1922 by the British Columbia Government in locating the boundary between the Provinces of British Columbia and Alberta in the vicinity of the Yellowhead Pass.]

On July 11th an aeroplane, D.H. 4B, G — C Y D M, from the Air Board Air Station at High River, Alberta, arrived at the landing-field at Henry House, between the railway and the Athabaska River, about 10 miles north of Jasper. The machine was piloted by Captain J. H. Tudhope, of the Air Service. July 12th the Superintendent at Jasper Park, Colonel S. M. Rogers, motored me to the landing-place and Captain Tudhope took me on an initial flight over the vicinity of Jasper.

On the 13th I was taken from Henry House landing over the course of the Interprovincial Boundary, the main watershed of the Rockies, from Yellowhead Pass, following Miette River to Colonel Mountain, Moose Pass, Bess Pass, Jackpine Pass, and Jackpine River. Farther north the clouds were rolling over the divide and it was too dangerous to attempt crossing the

mountains hidden in them. As a result of frequently edging away the wrong divide was followed and we came out in view of the Fraser Valley. An attempt was made to retrace our course, but the clouds were getting lower and travelling was becoming more and more dangerous amidst the close mountain surroundings. We had been out for nearly three hours, so Captain Tudhope decided to return to the Fraser Valley and effect a landing somewhere. A level field of timothy, showing like an emerald-green spot from the air, near a railway-station surrounded by buildings, was selected and a good landing made. We found we were at McBride, 120 miles from our starting-place. Gasoline was procured and a return flight made up the Fraser Valley at an altitude of 8,000 feet. It was a serious matter to be practically lost amidst the clouds in a region of high mountains, as no known landmarks could be distinguished, but the competent skill and good judgment of Captain Tudhope brought the flight to a safe ending. Colonel Rogers and Mr. Lambert at Jasper were greatly concerned at our protracted absence, as the plane was long overdue for return. Some useful information was obtained which prevented loss of time in the survey-work.

On July 16th Captain Tudhope took Mr. Lambart for a most successful flight along the entire length of the watershed from Mount Robson to Jarvis Pass, close by where it is supposed the 120th meridian crosses the watershed of the Rockies on its northward course. The weather conditions were absolutely perfect and Mr. Lambart obtained a large number of photographs from the air. Those of Mount Robson were very fine, and also of Mount Sir Alexander (Mackenzie) and Mount Ida, the big prominently seen mountains about 100 miles north of Mount Robson, situated a short distance south-west of Jarvis Pass in British Columbia. Jarvis Pass was identified by the chain of lakes at its summit. Some of the views obtained will be of considerable use to the topographical division for its map-work.

Of the trip Mr. Lambart writes: "Mount Sir Alexander will never be climbed. It is an absolute knife-edge of snow, not even corniced along its full length. It is surrounded by a high-level ice-field, the best approach to which is from the north. The only possible attempt at an ascent is from the east side. I have photographs looking straight down on the peak. Mount Ida, only a few miles away, is another Matterhorn of the Canadian Rockies and is not much lower than Mount Sir Alexander. The mountains and wide open valleys north of Mount Bess are easy, and the timber seems particularly vigorous. North of Jarvis Pass the country is not excessively high, as the snow- and ice-covered mountains from here on seem to swing distinctly more to the westward."

In 1911 an expedition to the Mount Robson region was organized by the Alpine Club of Canada under my leadership. With this expedition the Smithsonian Institute of Washington collaborated for zoological and botanical purposes. I then made a photo-topographical survey of the area traversed by the watershed from Yellowhead Pass to some distance north of Mount Robson, which resulted in a preliminary map of the region. The Department of the Interior assisted the expedition by supplying the necessary instruments and photographic plates, and subsequently made the enlargements of the views obtained for map-work. The British Columbia Government assisted the expedition financially.

The photographic negatives then obtained were filed with the Surveyor-General at Ottawa and were available for use in conjunction with last season's work. Owing to this fact material for a very full season's work was in hand and a larger area is ready for mapping than could possibly have been obtained otherwise, even had the weather conditions been most favourable. The supplementary data of the 1911 survey was particularly fortunate in view of the fact that the season of the topographical division was necessarily cut short in order to permit of Mr. Cautley's division completing the production of the 120th meridian southward as far as possible towards the summit of the main range.

In all, eight passes across the watershed were located, namely: (1) Miette Pass; (2) small pass at the head of the South Branch of Stony River; (3) Colonel Pass at the head of Colonel Creek; (4) small pass at the head of a tributary of the East Branch of Moose River; (5) Moose Pass; (6) Robson Pass; (7) Wolverine Pass; and (8) Bess Pass.

MIETTE PASS.

This pass is situated at the headwaters of the Miette and Stony Rivers and divides them from the headwaters of Grant Brook, a tributary of Fraser River. The pass has three distinct passages, the most southerly draining to Miette River and Grant Brook respectively, and the

other two to Stony River and Grant Brook. They lie in open grass-land country and their summits are practically above timber-line.

STONY RIVER PASS.

The summit is at the head of the South Branch of Stony River and is only a few miles from Miette Pass in a north-westerly direction. It lies in a narrow valley and its chief importance is that the direct trail from Yellowhead Pass to Colonel Creek and Moose River crosses it.

COLONEL PASS.

This pass is at the head of Colonel Creek, a tributary of Moose River from the east. The vicinity of the summit is a delightful spot on the Alberta side, with two little lakelets and charming camp-grounds. The crossing is a low one and lies in timber. The descent on the British Columbia side is steep, but horses can easily be taken across. Some 5 miles of newly cut trail down the creek connects with the trail up Moose River.

MOOSE PASS.

The summit is in a narrow valley filled with rock-fall and is well above timber-line. The characteristics here are peculiar; crossing from the south, the summit is apparently reached, when it is discovered that a small tarn in a deep basin sends its flow southward to Moose River. The tarn is lower than the apparent summit, owing to a piled-up mass of rock debris, through which the stream flows, having filled in the valley below it. The valley is very narrow and the sides rise steeply from its bottom.

ROBSON PASS.

A wide shingle-flat with scattered bunches of small spruce fills in the space between Berg Lake on the British Columbia side and Lake Adolphus on the Alberta side, a little over a mile apart. The flat is at the foot of the Robson Glacier, which is divided into two tongues by a nunatak much covered by moraine. The north face of the nunatak is free from ice, which has now retreated on either side and leaves it as a boundary to the flat. The main flow from both tongues is to Berg Lake, but a certain amount of water finds its way from the eastern stream to Lake Adolphus.

The whole of the mass of Mount Robson is in British Columbia. The massif with its glaciers and glacial lakes covers an area of over 30 square miles and measures 3 miles through at the base, where it rises $1\frac{3}{4}$ miles into the air above the Grand Fork Valley.

The widespread fame of this great mountain, the highest of the range, and the spectacular beauties of its ice-bound surroundings attract a large amount of tourist travel. On this account it is advisable that a detailed survey should be made and the pass summit be monumented. It is, moreover, the direct route from the Fraser River to the headwaters of the Smoky River, a tributary of Peace River, although at the present time it is only open to pack-train travel.

WOLVERINE PASS.

This pass presents a most complicated bit of topography and an example of a crossing of the watershed of the Great Divide such as has not heretofore been seen by the boundary survey. Glaciers from Mounts Whitehorn, Longstaff, and Gendarme here converge in a magnificent ice-fall at the head of a valley, and the streams flowing from it spread out into many channels and find their way to a wide, marshy, open area a mile distant, which resembles a muskeg. They then divide in the direction of their flow, the larger quantity of water flowing north-west to form the Holmes River, a tributary of the Fraser, and the smaller flowing north-east to form Wolverine Creek, a tributary of Smoky River.

BESS PASS.

The summit of Bess Pass is reached by the valley of Bess Creek, a tributary of Smoky River. The approach on the Alberta side is short, some 6 miles, and presents an easy grade all the way, the route for the most part lying along the shingle-flats of the stream and crossing the many channels intersecting them.

On the British Columbia side, however, there is a very steep descent to the bed of Holmes River. A short distance west of the summit the trail climbs a shoulder of Mount Bess and,

having descended for several hundred feet, traverses the south-western flank of the mountain to Jackpine Pass. A few miles north of Mount Bess is Mount Chown, the most northerly outstanding peak of the Rainbow Mountains group, of which Mount Robson is the central massif.

Bess Pass is the direct line of communication from the Smoky River Valley on the east side of the watershed to the Fraser River Valley by way of its tributary, Holmes River. At the present time there is no trail leading from the summit of the pass to the Holmes Valley, and the descent on the British Columbia side is more than 2,000 feet.

GAME AND FISH.

Game is plentiful throughout the area covered by the survey. A number of moose were seen in the Wolverine Pass and tracks were plentiful elsewhere. Woodland caribou frequent the highland meadows. Small deer are plentiful. On the high crags the mountain-goat has its home and bear are in the woods. Several species of grouse were noticed and ptarmigan in the rocky ground on the alp-lands. The porcupine pest was much in evidence.

Trout were caught in the upper waters of Miette River, where they are plentiful, and Mr. Lambart reports that trout were caught in Grant Brook on the British Columbia side. There may be fish in the Moose and Smoky Rivers, but the waters of these streams were in a very muddy condition all summer owing to the continued dry, hot weather, and none were seen.

GENERAL REMARKS.

North and south of Yellowhead Pass Summit much of the timber has been burned and is now a dense *brulé*. A small quantity still remains on the slopes that may be of use. Where green timber is seen in the Moose and Smoky River Valleys it is of moderate size and not of high economic value owing to the impossibility of getting it out. A few small stands of apparently good cedar are located in the valley of the Fraser River tributary known as the Grand Fork, but there is no large quantity and much of the timber along the stream and north of its source in Berg Lake has been burned.

The area is not as yet well served by trails, and where they exist they wind through very marshy or rough, rocky ground and climb up and down over mountain-ridges in steep ascents or descents. The trail up Moose River is particularly bad. Much time was spent in opening up new pieces of trail to reach necessary objectives. Beyond Bess Pass conditions grow worse, particularly in the Jackpine Valley, and the hills it is necessary to ascend and descend are stupendous.

The Rainbow Mountains group, across which the survey extended, is very fine and has attracted considerable attention the world over. Mount Robson is the climax of the group. Besides having the distinction of being the highest peak of the main range of the Canadian Rockies, it presents a most spectacular setting of ice and snow and many fine glaciers descend from it. Mountain tarns of intensely blue colours are seen in the surrounding valleys and delight the eye. There are many other ice-fields and glaciers in the vicinity and magnificent waterfalls abound, so much so that the name "Valley of a Thousand Falls" has been applied to the one encircling the base of Mount Robson on the north-west.

In this magic region of natural beauties British Columbia possesses a great heritage and one that is attracting, and will attract, tourists from many lands.

EXTRACTS FROM THE REPORT OF R. W. HAGGEN.

DATED OCTOBER 24TH, 1923.

[Mr. Haggen was employed in 1923 by the British Columbia Government in making surveys in the vicinity of Quesnel Lake.]

Five sections were subdivided in the vicinity of Bouchie (6-Mile) Lake. These lie on or near the Quesnel-Blackwater and from 6 to 12 miles distant from Quesnel: pre-emptors have filed on eleven of the twenty quarter-sections, and, though they have only been in occupation

for a short time, considerable work has been done. A road that would serve to give access conveniently was built in the settlement since the survey.

On Lot 903, the southerly of the lots, there is a large swamp, or perhaps one should say muskeg, that at present produces no grass; this is now being drained in the expectation that it will be good farming land; the ultimate value of such places is in my opinion very doubtful, as many of them have no soil with any life in it. The surrounding land is uneven, wooded with jack-pine and spruce, and the soil is poor.

On the remainder of the lots there is bottom land lying in a depression which runs about parallel with the road and on which there is a deep rich loam; even crops that had received no care during the summer (the pre-emptors having to earn a grub-stake away from home) did well. The bottom land is very heavily wooded with willow, alder, poplar, and birch, but those who keep working at it seem able to clear an acre a month; the balance of the land consists of rolling or broken country wooded with birch, jack-pine, and poplar, with poor soil, but affording very good summer pasture. The whole area seems to be one well adapted to mixed farming, within 12 miles of Quesnel if the day comes when that town once more becomes a market, and a locality where the settlers are close enough together to have some community life.

There is a school near Bouchie Lake, practically in the centre of the settlement.

At Alexandria three lots were subdivided and a tie run along Australian Creek Valley to Lot 307.

Australian Creek here is in a low depression in the rolling, jack-pine country; in the valley there are some small meadows, one only of which I would consider of any value, and it would produce but a small quantity of hay. A road leads into the section from Moffat's ranch at Alexandria, midway between Soda Creek and Quesnel, this road giving access to the Cuisson Creek section and numerous lots along the bench.

At Cuisson Creek two lots were subdivided. These lie on a large swampy area, part of which has been reclaimed for hay land. These lots, 8002 and 8003, have been settled for several years. Access is by way of road from either Mile-post 182 or 187 on the Cariboo Road, the former road having been built this year. The Cuisson Creek Valley, while rather inclined to be frosty, has some good soil in addition to the hay meadows, and will be a good dairying and mixed farming section in the course of time.

Lot 651, surveyed on the west side of the Fraser near Alexandria Ferry, is a good agricultural lot, similar to the land on the Webster and Middleton places adjacent; while it is not hay land, irrigation being necessary for this crop, it is excellent for the production of grain and vegetables, the locality being generally considered as the best for this purpose in the district. This lot is near school and post-office and a good road leads to Alexandria Ferry and also to Quesnel. This locality is free of summer frost; domestic water is obtainable on Lot 651; there is very fair pasture in the locality, and, when conditions take a more favourable turn, every reason to expect that settlers will do well.

From Alexandria I moved to Quesnel Lake, the scene of the Cedar Creek gold discovery. A village has sprung up at the outlet of the lake, the old Golden River Dam, and the post-office at this point is called Likely.

The surveys made near Likely consisted of three lots, one embracing an island between the old spillway and Quesnel River, one covering an old pre-emption near the dam, and one being a resurvey of a pre-emption now abandoned, the lake-front at this place having changed considerably as a result of the lowering of the dam. As agricultural ventures these parcels could not be recommended, as Quesnel Lake generally is not replete with farm lands: they are merely home-sites, though Mr. McMahon has a nice garden on his place. From the lake-shore the hills rise abruptly; in areas where fires have never broken out there is a growth of balsam, spruce, hemlock, and cedar; where fires have swept there is a tangle of *brulé*, a variety of second growth, and, to add zest to the lives of those who travel in such places, some devil's-club ready to grab if one is dubious of his balance.

The first traverse made was along the new Keithley Road, which replaces the old road from Quesnel Forks; this road follows the valley of Coquette Creek through a deep valley with precipitous sides; then skirts the benches of the North Fork of Quesnel River to Spanish Creek, where the North Fork is crossed, the valley being followed to Keithley Creek. One or two cars

went to Keithley Creek this year, though the road is only now completed. Along this traverse lots and placer leases were tied in, mile-posts, permanently set, left as points to which future surveys can be tied, and extensions of this traverse made to map Spanish Lake, Spanish Creek, and the mouth of Coquette Creek; the traverse was tied to Lot 218, an old survey on the North Fork, which I had tied in in 1916, from Quesnel Forks, and from which connection is made to Keithley.

At several points along this road there is mining being done and some gold being recovered, though no discovery has been made that has developed into a producing mine. A quartz property is being prospected near the lower end of Coquette Lake and has good enough indications to warrant thorough prospecting.

Fish and game, a few years ago numerous, are scarce in the area in which we worked. Quesnel Lake at the dam was one of the most famous spots in the Province for trout-fishing; now the fish are very scarce. When the dam was standing and the water diverted through the gates and spillway, the eddy below the latter was well stocked with trout, many of great size; probably they would stay there until they made up their minds to essay the hard trip up the fish-ladder and into the lake, and it is not beyond reason to suppose that before essaying the journey they were really hungry and keen to bite anything that came in sight. Now the river flows in the natural channel with no more obstacle than a low drop over portion of the dam; the superstructure, which had pretty well rotted, has been removed and a bridge built on the old foundation of the dam. This change may account for the falling-off in fishing, but in that case it would be reasonable to expect the fish to be numerous up the lake and in the tributary streams; unfortunately this is not the case, and the theory is now advanced that the ova and fry have been destroyed by other fish, especially whitefish, which are now in swarms in the streams.

Of game there is a lessening in fur-bearing animals and grizzly bear; moose, caribou, deer, and black bear continue to increase; grouse of all kinds are more numerous this year than I have ever known them to be in the district. Of the migratory birds there are fewer ducks this year than is usual, but more geese.

The final work of making the surveys near Moffat Creek was done early in October, three parcels, containing 400 acres, being surveyed. These are all dry meadows, containing deep humus, and the settlers are satisfied that they can make good fields of them by cultivation. Certainly the cost will be small for clearing and the soil is good enough to justify optimism. If it is demonstrated that the development of these dry meadows, which lie at an altitude of some 3,000 feet, is justifiable it is going to be of great aid to the district, enabling settlers to be producing something in the second year on their places. I know it is not uncommon to refer to the wild-hay meadows as the curse of the country, yet they do not involve the heart-breaking, unremunerative work of clearing, which comparatively few settlers are able to stand. If it is practicable to develop the dry meadows to timothy and clover fields it is going to rather upset a prevalent idea that ploughing ruins the meadows.

I saw the nicest produce raised in the Moffat Creek Valley at R. Kinvig's place that I have seen in the district. This land must lie at an elevation of 2,600 feet and in a valley notorious for summer frost. The potatoes, beets, cauliflower, peas, oats, and rye would have justified exhibit at the Provincial Fair; the wheat, which was well filled, was rather soft. This was grown in willow bottom. Experiments with crop on the jack-pine land were unsuccessful. Mr. Kinvig states that the potatoes were frozen down three times, but not injured. The method he uses in a frosty locality is to get the eyes sprouted in the light, but under cover, before planting; then, as the sprouts come above the ground, to keep them hilled for some time, the main idea being, I take it, to have the plants thoroughly matured before the nights became frosty regularly. We have been prone to consider agriculture in some of these upland valleys as very limited in its possibilities; the production of such crops as were raised in this case cannot fail to alter that view, and I feel that some measure of instruction to settlers is the great necessity. It does mean that it is necessary to use intelligence in raising crops and to devise means of combating obstacles which the district naturally offers. Some variation may perhaps be necessary in the methods used in the Lower Fraser Valley or on the prairie, and even with the best of instruction and opportunity the personal element making for success or failure in the individual will have its effect too.

EXTRACT FROM THE REPORT OF J. A. F. CAMPBELL.

DATED NOVEMBER 3RD, 1923.

[Mr. Campbell was employed in 1923 by the British Columbia Government in making surveys in the vicinity of Cluculz Lake.]

BETWEEN CANADIAN NATIONAL RAILWAY AND CLUCULZ LAKE.

The boundary between the Coast District and the Cariboo District passes along the eastern boundary of Townships 1 and 8 and is almost the dividing line between the open poplar country to the west and the more heavily timbered country to the east.

About forty lots lying between Hulatt and Finmoore, on the Canadian National Railway, and south to Cluculz Lake and west to the boundary of the Cariboo District, were subdivided.

This particular area of land has a more or less heavy growth of poplar, aspen, lodgepole pine, and spruce, interspersed with stretches of lightly wooded country and a few wet meadows. It may still be considered part of the general Nechako Valley as far south as Cluculz Lake, when the gradual rise to the Telegraph range of mountains is encountered. The ascent from the Nechako River is about 300 feet high and very abrupt, but from the top of the river-bench the country flattens out, and with the exception of a few slight rises and creek-valleys the land is fairly level for about 10 miles south.

To the west of Cluculz Lake, in the vicinity of Sob Lake, the country is very flat and is not much above the level of either lake, and for about 4 miles there is a series of wet meadows. These meadows centre around Sob Lake and a great amount of labour has been expended on a drainage system with very good results. The largest of the meadows contains about 1,000 acres, mostly ditched and drained and part of it under cultivation. In ten sections in this vicinity I should estimate that 2,000 acres is meadow land, much of it wet meadow, but all capable of being drained, as most of it has no water standing on the surface, although the soil is too damp to cultivate in its present state.

In the area between the Canadian National Railway and Cluculz Lake a fair percentage of it is under cultivation, the greater part under cultivation being in the vicinity of Sob Lake. The principal crop is timothy-hay, enough of the crop being retained for winter-feeding of stock and the balance is sold and shipped to camps and mills located along the railway. Some of the larger meadows have not been sown to timothy, but the wild hay is cut, baled, and sold, though this is not always satisfactory, as just as much time and labour is required to harvest the wild hay and the price received is considerably below that obtained for timothy.

Clearing the land of the spruce and lodgepole pine runs to between \$30 and \$75 per acre, including stumping, etc. In some places where the timber is small poplar with stretches of willow-bush the cost of clearing would be proportionately less, but with the exception of meadow land clearing is necessary on all the land.

Most of the hay and other crops from this area is marketed and shipped from Hulatt, although about the only steady demand is for hay of good quality, and most of the root-crop is used as fodder for cattle raised on the farm.

There is a general store, post-office, and school at Hulatt and the same at Finmoore, both these places being on the Canadian National Railway.

CLUCULZ LAKE.

Cluculz Lake is about 50 miles west of Prince George, 25 miles east of Vanderhoof, and 6 miles south of the Canadian National Railway. The lake is 10 miles long and not over a mile wide at its greatest width. The banks slope gently back from the lake-shore and the ascent is nowhere abrupt, except towards the eastern end, where the banks rise sharply for about 75 feet. In some cases the land has been cultivated almost to the water's edge, as there is no swampy land bordering the lake, with the possible exception of a small portion near the western extremity.

Vacant land adjoining the lake to the south was surveyed, the land towards the western part of the lake being surveyed into 160-acre lots, while to the east full-sized lots were run in. The land surveyed is somewhat similar to the general class of land throughout the district, having a white clay-silt soil with a vegetable loam. The timber is principally small poplar, pine, and a scattering of average-sized spruce and a few scattered fir close to the lake. There is

perhaps a greater percentage of small meadows and fire-cleared land than is usually found in the same-sized area, this being true the farther the surveys were carried south.

The meadows, which in the majority of cases are fairly dry, follow the numerous small creeks that drain into the lake, and are not of any great width, though what they lack in width is made up in length, some of them a few hundred feet wide crossing an entire section. There are some average-sized meadows varying from a couple of acres to 20 acres that have good growths of wild hay and red-top, and no doubt will make excellent agricultural land when properly cultivated.

Considerable work is being done on a number of farms south of the lake, and a new road was built this summer from Sudgen's Point, a bold prominence on the south shore of the lake, south to different farms, giving them an outlet to the lake. A ferry was constructed to connect the south shore with the road on the north shore, this road connecting with Finmoore, about 6 miles north on the Canadian National Railway. On the north side of the lake there are a few farms that have considerable land under cultivation, each farm having a few head of stock. By far the greatest area under cultivation in this vicinity is near Sob Lake, a mile or so to the west of Cluculz Lake.

At one time early in the last century there was a large Indian village on the north shore of Cluculz Lake at the point now known as North Bay. According to "The History of Northern British Columbia," by Father Morice, O.M.I., this settlement numbered many hundreds, but most of the Indians in the village were massacred by the Chilcotins during a night attack. Those that escaped moved to Chinlac, at the mouth of the Stuart River, and after this village was wiped out by the same warlike tribe the few remaining settled at Nulki Lake, on what is now known as the Stony Creek Reserve, even at that time a large and prosperous settlement, where the numbers were too great for the Chilcotins to venture further attacks. Descendants of the original inhabitants of Cluculz Lake make yearly visits to the lake to fish and hunt. One old Indian told me that his father and grandfather had always come to Cluculz Lake in the fall of the year to fish for whitefish, of which there is an abundant supply in the lake and at the outlet of Cluculz Creek. The Indians in the district belong to the Carrier Tribe, and depend principally on fishing and hunting, with perhaps a few acres under cultivation on the larger reserves.

CLIMATE.

The precipitation in the Nechako Valley is light, but quite sufficient for all requirements. During the months of June to October, inclusive, there were seventeen days on which the rainfall was heavy, principally in June and early July and the later part of October, and a number of days of light showers. The prevailing winds are from the south-west, high winds being the exception, although in the later part of June there were days of very brisk winds from the west and south-west.

No frosts were recorded until September 3rd, when the thermometer fell to 29° at 4.30 in the morning. From this date on there were occasional mornings when the thermometer would record below freezing at 5 a.m., the temperature quickly rising as the sun came above the horizon. Most of the early morning frosts were noticed when camped at lakes. The highest temperature recorded was 90° at noon on August 17th, the lowest being 22° at 5 a.m. on October 8th.

The average noon temperatures, taken in the shade and protected as far as possible from wind, together with the number of days in each month upon which rain fell, either heavy rains or showery, were as follows:—

	Tempera- ture.	No. of Days.
June	67	8
July	68	8
August	71	9
September	67	6
October	59	6

The snowfall in winter is from 18 inches to 2 feet and is very light and powdery. Some years it may be greater than this, but it is seldom over 2 feet in an ordinary year. The winter temperature drops to 40° below zero, but the low temperatures are the exception and last only a day or so at a time; in some cases only a few hours. The average over the winter, from November 15th until April 15th, would be about 22° above zero. There are no high winds in winter, and this is especially true when the temperature is at its lowest. The first heavy snow-

fall usually occurs between November 15th and the first week of December and lies on the ground until the first week in April, when it rapidly disappears. A thaw regularly makes its appearance early in February, and from this time on there is very little further snowfall, but short periods of soft weather, with a stretch of fairly cold weather about the middle of March. The thaws make their appearance very regularly and the days of soft weather can be almost foretold to the day from year to year.

TRANSPORTATION.

The Nechako Valley is exceptionally well supplied with good roads. With Vanderhoof as the centre, good graded dirt roads branch out in every direction. During the summer months better roads could not be wanted, although in the spring, when the frost is coming out of the ground, they are not in the best of shape until the grader is run over them. Any part of the country adjacent to Vanderhoof can be reached by motor-car, and this is saying a great deal when it is taken into consideration that the country is comparatively new as far as settlement and road-building is concerned. A road runs from Vanderhoof to Prince George and is in good shape for wagon or motor-car, some 25 miles of new grading being completed on it this summer and the balance of the road put in first-class shape. There are other main roads from Vanderhoof—to Fort Fraser, Quesnel, and Fort St. James—that are graded, together with a number of well-graded roads through the farming areas. During the summer I used a motor-car on the survey and found no trouble in reaching any point of the work with the car. Some of the farmers have tractors and cars which assist them greatly in getting their produce to market and breaking the land. The Canadian National Railway from Prince Rupert follows the Nechako River and wagon-roads branching from the main roads are built to the majority of stations in the valley.

GAME AND FISH.

There are numerous lakes in the district, all well supplied with fish. Cluculz Lake has an abundant supply of rainbow trout, char, whitefish, and kokanee, some of the char or lake-trout running as high as 20 lb. in weight. The other lakes in the vicinity have a good supply of fish, especially trout and whitefish, although the char in the smaller lakes do not usually run as large as in Cluculz Lake.

Game is fairly plentiful, but not in as large numbers as farther east, although in the vicinity of Cluculz Lake, Stuart Lake, and a number of the smaller lakes there is a good supply of deer and black bear. On Sinkut Mountain there are many black bear and a short distance north of Bobtail Mountain a few grizzly have been reported seen at different times. In the fall of the year the deer are numerous along the Nechako River, and in the sloughs and slack water of the river the ducks and geese are very plentiful in September and October. There were many grouse this year, more than usual in fact, and I think that the killing of great horned owls, the greatest enemy of the grouse, has had a great deal to do with the grouse returning in large numbers, as a few years back the country was almost depleted of grouse.

TIMBER.

There is no merchantable timber of any amount in the Nechako Valley. There are good stands of milling-timber on the Stuart River, but this has to be cut and driven down the Stuart to a mill erected on the railway before it can be profitably utilized. An industry that is developing rapidly, however, is that of tie-making, and there are some good stands of lodgepole pine in the vicinity of Hulatt and Finmoore and farther back at Cluculz Lake that may be logged with profit. Outside of the timber on the Stuart and the tie-timber mentioned, no merchantable timber came under my notice during the summer.

EXTRACT FROM THE REPORT OF L. S. COKELY.

DATED NOVEMBER 13TH, 1923.

[Mr. Cokely was employed in 1923 by the British Columbia Government to resurvey the burnt-over area in the valley of the Upper Fraser.]

The Fraser River has its source in the Yellowhead Pass and flows westerly until Prince George is reached, where it makes an abrupt turn to the south. My work this season lay in that portion of the valley to the east of Prince George. Near the pass the valley is very

narrow and the river so small as to be easily forded; as one goes west the valley widens to a width of about 3 miles at McBride and 7 miles lower down. The Grand Trunk Railway traverses the valley as far as Prince George, where the river is left as the railway continues on to the west.

Throughout the valley are evidences of a good stand of Douglas fir and spruce, but repeated fires have brought devastation. The first great fire to sweep the district occurred, according to the Indians, about sixty years ago, and since then, notably during railway-construction days, the valley has been repeatedly burned over, and there is now little of the original timber left. It was noted that there was practically no reforestation of the coniferous trees, but the country is fast growing up with poplar, alder, and willow. In various places are stands of fire-killed cedar which are being cut for poles and shipped to the Prairies. In view of the keen demand for poles at the present time this constituted one of the principal industries this year, pole camps being in evidence in every locality.

My work consisted of restaking a portion of the burned-over area. In many places, although the original survey was only eleven years old, not a trace of the old lines or posts remained. In the valley generally the only method available for marking a survey corner is a wooden post and bearing trees, it being impossible to erect cairns about the posts, as there is a complete absence of stones except on the side-hills. Consequently, when there is a thorough burn no evidence remains. The soil is a clay loam, in which are many small scales of mica, which make the surface glisten in the sun.

My first camp was near Dunster, a station on the Grand Trunk Pacific about 20 miles west of Tete Jaune Cache, which was so well known during construction-days, but which has dwindled down to two or three settlers now. At Dunster a good bridge crosses the Fraser, which is a fair-sized river at this point. Here there is quite a large settlement and many of the farms appear in a prosperous shape. The soil is fertile and clearing is cheap, and with the absence of stones a tract is soon put in condition for the plough. The surface is generally level, consisting of a series of benches. The valley is quite regular, but the river winds from side to side, easily doubling its length. Grain is one of the chief crops, but this has to be cut green and there is no threshing outfit available yet. Potatoes and roots and small fruits do very well, better on the benches than on the low-lying land along the river, which is more subject to frosts. The climate is not adapted to larger fruits on account of the severe frosts after the sap starts in the spring.

On either side of the valley the mountain ranges rise to a height of over 7,000 feet, or 5,000 feet above the level of the river. Here the mountain-slopes are quite regular and are easily climbed. The top of the range consists of a series of plateaus and it is delightful to spend a day on top, as one can walk for miles over a carpet of moss and lichen, away above the timber-line. There appears to be nothing but a broken mountainous country on either side of the valley, and in every direction snow-capped peaks are to be seen.

A continuation of these same ranges to the east form Robson Park and Jasper Park. Both of these parks attracted a large number of tourists this season, who spent considerable time traversing the many trails leading to interesting points away from the railways.

This is a favourite country for the sportsman, as big game abounds; goats are very plentiful and are of a large variety, some of them going as high as 450 lb. They range close in, but stay high on the mountains. Caribou are plentiful, but being more timid range farther back. Moose range in the vicinity of McBride and are quite easily obtained. There are many deer throughout the valley, and grizzly bear, the great prize of sportsmen, as well as black bear can be obtained by following up most of the tributaries of the Fraser. There are no sheep on the British Columbia side of the summit, but many range on the Alberta slope. As this is a good fur country, a few of the settlers do very well trapping in the winter.

The climate is milder than on the Prairies, although the altitude is about the same. The summers are warm, but the nights are cool even in the hottest weather. Winter comes early and the river freezes over the first part of November. The snowfall is not excessive, averaging about 2 feet. During the winter are cold snaps when the mercury is apt to drop away below zero for a short period. An abundance of rain falls during the summer, so no irrigation is needed. Some years the Fraser overflows its banks and floods the surrounding country; when this happens there is a plague of mosquitoes. Luckily, we had no mosquitoes this year; black-flies were a little troublesome, but this is certainly not a bad fly country.

EXTRACTS FROM THE REPORT OF A. O. WHEELER.

DATED DECEMBER 31ST, 1923.

[Mr. Wheeler was employed in 1923 by the British Columbia Government in locating the boundary between the Provinces of British Columbia and Alberta to the north of the Yellowhead Pass.]

CARCAJOU PASS.

This pass is locally known as "Wolverine Pass," but owing to there being a pass of the same name in a more southern location the name "Carcajou" has been substituted. It is described in the 1922 report of the Surveyor-General. The altitude of its summit is 5,120 feet above sea-level.

JACKPINE PASS.

A high trail encircles the south-west slopes of the Mount Bess massif and leads over the Jackpine Crossing of the watershed. The altitude of the pass summit is 6,694 feet and the direct distance from Bess Pass Summit nearly 4 miles. On the north side it falls steeply to the head of Jackpine River. The route is an arduous one, rising and falling 1,000 feet or more several times. The summit lies well above timber-line and the approaches on both sides are grassy or shale hills.

JACKPINE RIVER VALLEY.

The course of the Jackpine River is a little west of north for something more than midway of its length, when it bends to a north-east direction and joins the Smoky River. The upper part of the stream lies in a restricted bed bordered by a thick growth of spruce forest, with, on the east side, several open grassy slopes where avalanches in the distant past have swept away the timber. These "slides," as they are called, furnish excellent pasturage for horses. A few miles down the valley opens to gravel-bars, and then to broad, wet marshes, which, while not impassable, furnish very bad travelling for horses. These wet meadows continue for several miles to near the beginning of the bend. The valley then becomes thickly forested and the stream flows swiftly between walls of jack-pine and spruce.

The trail lies for the most part along the edge of the stream, where the going is better, although very uncertain owing to numerous mud-holes and swampy spots. Like the stream, it follows the line of least resistance, as all original trails do, and has a very erratic course. Taken as a whole, it is one of the worst trails to be found in the entire region.

Not far above the bend the jack-pine growth begins and soon fills the entire valley-bottom and the lower slopes enclosing it; hence the name. Scattered ponds are seen along some margins of the meadows close to the enclosing forested slopes. The stream flows through the meadows over a clear gravel-bed, and it is assumed that the marshy humus forming the meadow lands is merely a shallow deposit over a gravel-wash from the glaciers at its source.

MEADOW LAKE PASS.

The summit of Meadow Lake Pass is 24 miles distant from Jackpine Pass in a straight line N.N.W., but is probably one-third more by trail. It is at one of the headwaters of the stream, known locally as the "Middle Fork" of Jackpine River. The summit is in an open meadow with park-like bunches of spruce scattered picturesquely around. It lies at an altitude of 5,059 feet above sea-level. The valley is enclosed by steep slopes, heavily timbered with spruce, balsam-fir, and jack-pine. Two charming little lakes are seen, one on either side of the summit. The larger lake, that on the south or British Columbia side, is named "Meadow Lake" on the Jobe-Phillips map, a name that is somewhat incongruous, for the lake is surrounded by a dense fringe of forest-growth. It has a very picturesque setting.

BEAVERDAM PASS.

The trail cut out by the Topographical Division does not go direct to Meadow Lake Pass but follows the Middle Fork to its main source below Jones Pass Summit. This summit is not on the Great Divide but on a local watershed in Alberta, which separates the waters of the Middle and Western Branches of the Jackpine River. Beyond it the country opens out to frequent marshy meadows in the valley-bottoms. These beautiful golden meadows give the valleys a park-like pastoral appearance, and one looks to see herds of deer and flocks of mountain

sheep and goats browsing in their midst, an expectation that is seldom realized, at any rate during the summer months. They provide excellent pasturage for horses and numerous crystal rills with clear gravel bottoms flow through them at intervals. While wet on the surface, the grassy turf is of tough texture and permits of travel over it on horseback.

Beaverdam Pass is distant from Meadow Lake Pass 6 miles in a straight line N.N.W. Its summit has an altitude of 4,974 feet. The name is taken from the Jobe-Phillips map and is possibly due to an outcropping ridge of rock that extends across the valley, just below the summit of the pass on the British Columbia side, which has a resemblance to a dam. No signs of beaver were noticed around the small tarn seen close to the summit on the Alberta side.

A well-beaten trail from the junction of the Middle Fork with Jackpine River leads north-westerly. It crosses the West Branch and, passing over the watershed at Beaverdam Pass, turns south-westerly on the way to McBride, a village of the Canadian National Railway in the Fraser Valley. There are some mining prospects a few miles westerly from Beaverdam Pass Summit and presumably the trail connection has been made to them. Hunting-parties also come in from McBride and pass over to the Jackpine valleys. It is likely also used to bring in trappers' supplies, for cabins and trap-lines were noticed in the neighbourhood of the pass on the Alberta side.

AVALANCHE PASS.

In a straight line, slightly west of north, the distance between the summits of Beaverdam and Avalanche Passes is practically 3 miles. The altitude is 5,195 feet. The summit lies in an open meadow similar to those already described. The approach from the south is very gradual but much steeper on the British Columbia side. The name is from the Jobe-Phillips map, and the reason for it is likely due to a snowslide that took place at the summit of the pass very many years ago and has left some rotting debris of the timber it swept down at the time. It is not a spectacular slide and but slight indication of it is left to tell the tale. It is the only evidence of an avalanche apparent in the vicinity. The West Branch of Jackpine River heads on the south side of the pass and a small stream flowing to the South Branch of Morkill River on the north side.

SOUTH MORKILL PASS.

On leaving Avalanche Pass Summit the course of the watershed turns from a previous N.N.W. direction to one nearly due east and describes a broad loop around a basin which contains the headwaters of the South Branch of Morkill River, a tributary of Fraser River known locally as "Little Smoky River." South Morkill Pass crosses the watershed near the top of the loop. The altitude of its summit is 5,434 feet. One of the heads of the Muddywater River, which may possibly be the main source, flows from it on the Alberta side. The country here consists of broad meadow-land valleys and areas of open spruce forest divided by low mountain ridges. It has a beautiful park-like appearance and is delightful to travel through. There is unlimited feed for horses and it is ideal for game. It is not to be wondered at that parties of tourists and hunting-parties visiting it, of which there are many, should be filled with rapture after the trials and tribulations of the Jackpine Valley.

MUDDYWATER PASSES.

A pass over the watershed about 7 miles north of Avalanche Pass separates the waters of Sheep Creek on the Alberta side and the North Branch of Morkill River on the British Columbia side. This crossing has been designated North Morkill Pass. It lies beyond the scope of the 1923 season's survey, but between it and South Morkill Pass are two other crossings of the watershed which are here referred to as South Muddywater Pass and North Muddywater Pass. The south one lies some 4 miles north-west of South Morkill Pass and the other some 3 miles farther north. The South Muddywater Pass separates the waters of the South Branch of Morkill River from those of the North Branch of the Muddywater, and the other the waters of the North Branch of the Morkill and the South Branch of the Muddywater. The altitude of the summit of South Muddywater Pass is 5,924 feet. That of the north pass is not yet known as it lies beyond the scope of the season's survey.

GAME AND FISH.

From Carcajou Pass northward, in the vicinity of the watershed, is a good game country and plenty may be found by those who know where and how to look for it. Moose are plentiful

in the more heavily timbered areas where marsh lands and ponds abound, as at the head of Holmes River and Carcajou Creek, and in the upper reaches of the Jackpine River, where the wide swampy meadows provide good feeding-grounds. Woodland caribou are plentiful and are seen on the open ridges and in the meadows along the forest margins. In the late fall and early winter they are to be seen in droves. Mountain-sheep can be found along the shale and rocky ridges at the heads of the Muddywater and Sheep Creek. Goats are high up near the summits of the mountain ridges, but come down lower in the fall when feed amidst the crags gets scarce. Small deer are in all the woodland and can frequently be seen. Bear, both brown and grizzly, are to be met with, but most often on the British Columbia side, where the formation is more rugged and the forest-growth thicker.

Signs of beaver, such as houses, dams, and cutting of trees, were seen in the more swampy valleys of the Holmes and Jackpine Rivers and of Carcajou Creek, but not to any great extent, and are doubtless to be seen in many other valleys on the British Columbia side. Trappers' cabins and trap-lines were noticed in a number of the valleys, but no fur-bearing animals were seen.

No fish were found in any of the streams, but they are reported in Sheep Creek, and, if there, should be in all the adjacent Alberta streams. As trout are found plentifully in Grant Brook, a tributary of Fraser River, they should also be found in other tributaries of that waterway on the British Columbia side of the watershed. As a rule fish are not plentiful so near the glacial sources of the streams owing to scarcity of food for them.

GENERAL REMARKS.

The higher snow-clad mountains terminate a short distance north of Mounts Bess and Chown at Mount Resthaven, and from there on bare-topped ridges with outstanding elevations do not exceed an altitude of 8,700 feet above sea-level. In the far distance northward the isolated summits of Mount Sir Alexander, Mount Ida, and a few others rise to a little above or below 10,500 feet, but it is an isolated group and the last before reaching the flatter country of the Peace River District. Beyond the Jackpine the valleys between the mountain ridges are open and easily accessible, on the Alberta side presenting wide stretches of meadow lands, more or less swampy, and broad areas of alp-lands on the lower slopes mingled with belts and groves of forest-growth. On the British Columbia side the timber is more thickly grown and the meadow lands are fewer and farther apart.

No timber of high commercial value was noticed in sufficient quantity to make lumber operations desirable. Scattering bodies of spruce on the hill-slopes and of pine (*Pinus Murrayana*) on the lower benches of the valleys were seen in small quantities, but so near the heads of the streams that getting it out would be difficult and expensive. On the British Columbia side the valleys are more thickly timbered and Douglas fir appears, but the same conditions as to logging operations exist. So far forest fires do not seem to have been prevalent. There are burned-over tracts here and there, but they seem of ancient origin.

Notwithstanding the many difficulties, the region seems to attract tourists. Parties from Jasper, Robson, and McBride go in frequently and brave the horrible trails and stupendous hills with apparent enjoyment. The instinct seems to be to get into the unknown primeval wilderness, and the beautiful park-like valleys north of the Jackpine River when reached are worth the labour for both nature-lovers and big-game hunters. This tourist business is one that seems to be increasing yearly and one that provides a considerable income for that part of the country.

EXTRACT FROM THE REPORT OF H. McN. FRASER.

DATED MAY 27TH, 1924.

[Mr. Fraser was employed in 1924 by the British Columbia Government to make a traverse of part of McGregor River.]

The McGregor was formerly known as the Salmon River or the North Fork of the Fraser. It empties into the main Fraser about 40 miles north-east of Prince George.

The general direction of the river, looking up-stream, is north-easterly for a distance of about 36 miles to the mouth of the Herrick River, where it turns south-easterly. There are

two canyons on the river, which I shall term the Lower and Upper Canyons. The Lower Canyon is about 4 miles long and commences about 18 miles from the mouth of the river, its walls rising to a height of about 200 feet. The Upper Canyon is about 6 miles long and commences about 13 miles above the head of the Lower Canyon, and its walls rise for the most part perpendicularly to a height of about 300 feet.

The river seems to be sluggish for a distance of about 12 miles from its mouth, but beyond that the grade increases slightly and the stream becomes swifter. In the Lower Canyon the water runs moderately fast, probably about 6 miles an hour. Above the Lower Canyon the river again becomes slower up to about a mile below the Upper Canyon. From the mouth to the foot of the Upper Canyon the river is easily accessible in boats in the summer, except during high water.

TOPOGRAPHY.

The topography of the country adjacent to the McGregor River on the north side is very low and flat up to the foot of the Lower Canyon, and I am informed by the trappers that there are muskegs all along this side, which are more or less persistent, right to the foot of the Lower Canyon. About 2 miles below the mouth of Seebach Creek a range of low hills, about 800 feet high, was noticed lying about 3 miles from the river and continuing up-stream to the mouth of Otter Creek. These hills come steeply out to the river just above the Lower Canyon, where their altitude is about 1,000 to 1,200 feet. On the east side of Otter Creek, between it and the Herrick River, there is a lone hill about 3,000 feet high, which might be described as being about 2 miles from the McGregor and about 3 miles from the Herrick River.

On the east side of the Herrick and McGregor Rivers, above their junction, there is a range of high mountains lying from 1 to 2 miles to the eastward.

On the south side of the McGregor, commencing at its mouth, the topography is flat, the land adjacent to the river being very swampy up to within 2 miles of the foot of the Lower Canyon, at which point, I am told by the trappers, the country lying more than $\frac{1}{2}$ to 1 mile from the river is rough and broken. Above the Lower Canyon there is a range of mountains, the foot of which lies about a mile from the river and the height of which is approximately 5,000 feet. These mountains continue on up the McGregor seemingly to its source, but only just out to the river about 5 miles above the Upper Canyon. Between the mountains and the river, up to the foot of the Upper Canyon, there are swamps extending all the way.

TIMBER.

The timber is composed mostly of spruce and balsam, with a sprinkling of birch. There are flats immediately adjacent to the river which are timbered with cottonwood and poplars. The timber is of better quality and more dense on the upper reaches of the river than on the lower, with the exception of the balsam in the vicinity of the Upper Canyon, where it seems to be affected by butt-rot, many of the trees being dead to a height of 20 feet.

The timber on the mountain-sides, with the exception of the valleys of the streams tributary to the river, is generally of poor quality and scrubby. There is no evidence of bush fires in any part of this country.

CLIMATIC CONDITIONS.

The winters are usually moderately cold, and I found an average depth of about 6 feet of snow, showing that the snowfall is heavy, and I am told by the trappers that the rainfall in the summer is correspondingly large.

GAME.

Moose are very plentiful indeed, as are also black and grizzly bears. We saw quite a number of grouse and one flock of ptarmigan, and I was told by the trappers that the sloughs along the river were breeding-grounds for large flocks of ducks. The vicinity of the McGregor River also abounds in fur-bearing animals, such as fisher, marten, mink, ermine, and skunk. Timber-wolves are plentiful and are becoming a decided menace to the game, as they have rapidly increased in numbers in the last few years.

EXTRACTS FROM THE REPORT OF J. A. F. CAMPBELL.

DATED NOVEMBER 5TH, 1924.

[Mr. Campbell was employed in 1924 by the British Columbia Government in making surveys in the vicinities of Stuart River and Fort George Canyon.]

AN HISTORIC ROUTE.

The Stuart was first sighted and explored by white men in 1806, when traders of the Northwest Fur Trading Company, later amalgamated with the Hudson's Bay Company, entered the river and followed it to Stuart Lake, where the trading-post of Fort St. James was founded, which for many years was to be the fur capital of New Caledonia. Many of the men whose names are linked with pioneer days in British Columbia started as clerks in the Hudson's Bay post at Fort St. James and travelled the Stuart and Fraser Rivers with the fur brigades. Until the building of the Grand Trunk Pacific the Stuart was the main artery by which supplies were taken to Fort St. James and the posts to the north. Now Stuart Lake is connected to Vanderhoof by a good motor-road and the river is little used, except by an occasional hunting-party or trapper. There are many old camping-grounds at convenient points along the river, where the fur brigades would pitch camp for the night, the same places being used year after year until a considerable clearing was made. Old iron-studded river tracking-boots, broken cooking-utensils, etc., are much in evidence at the larger camping-grounds.

For 25 miles from its confluence with Nechako River the Stuart is shallow and swift, flowing between rather precipitous banks, with little or no river-flats, usually so noticeable along most of the northern rivers. Farther along the river the banks are not so steep and there are many well-farmed river-flats, but in the area surveyed the banks rise about 250 feet above the river at a slope of about 30°. From the top of the bank the land flattens out, and for miles back from the river there are practically no undulations, except where a slight decline is made to some creek or meadow.

VICINITY OF WEBBER LAKE.

The land adjoining Lots 5404 and 5429 and extending east to the Stuart River, a distance of 5 miles, has a growth of open small poplar and scattered pine, with a few patches of fir on the crest of the river bluff. There are a few small meadows in the area surveyed, the largest being about 30 acres in size. The clearing in most cases is rather light, some of the adjoining farms clearing from 5 to 10 acres of similar growth in a season, including slashing, burning, and grubbing the smaller stumps, the larger stumps being left to be blown with powder.

To the north of Lot 5429 the timber is principally lodgepole pine, fairly well scattered, the largest trees seldom exceeding 8 inches in diameter. During the summer a fire spread through this part of the area and in many instances completely cleared the land of timber and windfall without injuring the soil to any appreciable extent, except where the soil was shallow and light. In a few years' time the burnt-over area will make excellent grazing, as it is free from down timber and a great part of the standing timber. Within two months of the fire new grass had started and was growing with great rapidity.

All the land surveyed, together with the adjoining surveyed land, may be described as bench land, lying at an elevation of 2,300 feet and about 250 feet above Stuart River. There are a fair number of settlers in the district, the majority being of either Scotch or Norwegian descent, having settled within the past ten years from the Prairie Provinces. The settlement is locally known as the Webber Lake Settlement, taking its name from a small lake in the vicinity. Most of the farms raise stock for the market and keep a number of dairy cattle, the butter either being made on the farm and retailed or else the cream shipped to the Vanderhoof Creamery. The numerous meadows are used entirely for hay-raising to provide winter feed for the stock. Usually enough feed is raised on the farm to see the stock through the winter, but due to the dry summer this year there will be a considerable shortage, many of the farms getting less than half a crop. As a rule there is a plentiful supply of potatoes and roots, but again the dry summer interfered, and, coupled with a number of rather severe summer frosts, the crop is far below the average. I found it very difficult to purchase potatoes, etc., from the farmers, for in some cases they had just sufficient for their own use. The oat-crop was fairly successful and in most instances this crop was up to the average.

The nearest post-offices are at Chilko and Finmoore and at the latter place is a general store and school. There are also schools at Chilko and on Lot 5430, near Webber Lake. A portable sawmill is operated near the lake and a large number of the farm-houses are frame buildings instead of the usual log cabins.

FORT GEORGE CANYON.

Fort George Canyon is a contraction of Fraser River 18 miles below Prince George, where the river breaks through a shaly rock formation. The canyon, about a mile long, is U-shaped and the river is broken into numerous narrow channels by rocky islands with precipitous banks. At the lower end the canyon is 200 feet wide, and the river, especially at high water, rushes through with great force, making it extremely dangerous for canoes and small crafts.

Eight lots lying to the west of the canyon were subdivided, and with the exception of one lot that bordered the river, most of the land was on the high benches back from the river. Along the river at this point the land is rather rocky and good agricultural land is not encountered until the top of the bench, about 400 feet above the river, is reached. The bench land is extremely rich in quality and the clearing of the small poplar and willow very light. In places many acres can be made ready for the plough by the clearing of a few scattered willows and old stumps. The one or two settlers in the area have cleared considerable land without a great deal of effort, and their crops, principally hay, oats, and roots, were not damaged by the summer frosts or dry weather so prevalent in most parts of the district this year.

TRANSPORTATION.

The transportation facilities throughout the district are improving year by year, and is especially noticeable in the large number of motor-vehicles on the roads. Until the widespread use of the motor-car by farmers, many of the roads were no more than wagon-tracks through the bush, but the general use of motors has changed this, most of the roads being now properly graded and ditched and, where possible, are also gravelled. In the area in vicinity of Webber Lake there are a number of very good roads, especially the one running from Vanderhoof, passing Webber Lake to the north and crossing Stuart River a few miles north by a bridge. There is also a good road from Finmoore, the nearest station on the Canadian National Railway, running north and joining the Vanderhoof Road near Webber Lake. On both these roads motor-cars can be used. There are also numerous cross-roads, some in fair shape for wagons, while others can only be used satisfactorily in winter, as they cross too many swamp meadows for use in the spring and fall.

The Canadian National Railway follows the south bank of Nechako River, and at Finmoore and Hulatt, stations on the railway, are Government-operated ferries, the one at Finmoore being installed this fall. The ferries are in operation from 7 a.m. until 7 p.m. free of charge to passengers and wagons, with a small charge for crossing outside of these hours.

There is a daily passenger service, except Monday, on the railway, with the mail being carried east and west on alternate days, and a freight service east and west on alternate days.

INDUSTRIES.

Along Stuart River are scattered patches of heavy spruce and fir, together with a few timber limits of good spruce. The spruce near the mouth of the river is being logged off, the logs being driven down the Stuart and Nechako and held at Hutchinson, where a small mill is in operation. No doubt if this is a continued success the larger stands of timber on the Upper Stuart and lakes to the north will be logged and cut at mills on the Canadian National along Nechako River.

The making of railway-ties, at which, in former years, many men found employment in winter, has this year been cut in half, so that some of the larger contractors may not find it profitable to open their camps. To some extent this is favourable to the farmers who have a small stand of pine on their land and will be able to sell all the ties they make. At the price paid for ties, 67 and 57 cents, less a small commission to the larger contractor, a farmer who is in a favourable position will be able to add considerably to his income in the winter months.

CLIMATE.

Precipitation in Nechako Valley and along Stuart River is in most years fairly light, but is usually sufficient for all requirements, so that the past season, which was very dry with little rainfall, especially during the months of July and early August, cannot be used as an

average. Naturally the dry weather in the early part of the summer was damaging to the crops, giving in many instances less than half a crop. The light rainfall in the summer was more than compensated by the heavy rains in September, but too late to be of much benefit to the farmers.

The highest temperature recorded was on August 10th, when the thermometer read 100° at noon, but this high reading was partly due, no doubt, to the proximity of forest fires. There were a number of days in July and August when readings of more than 90° were noted. In the latter part of June and early July there were severe morning frosts, but summer frosts in this district are not unusual, but are not of the frequency of former years.

The snowfall in the winter months is seldom over 2 feet, and very low temperature for any length of time is exceptional. Occasionally it may drop to 40° below zero, but the duration of these cold spells is not over a day or so, the average winter temperature being well above zero.

GAME AND FISH.

There is plenty of game in the country, moose, deer, and bear being the more plentiful, with a fair number of grouse and many ducks and geese in the fall. To the north of Stuart Lake, where the country is mountainous, there is an abundance of grizzly bear, sheep, goat, moose, and caribou, besides a large number of smaller game. A party from the Eastern States spent six weeks in that district, and all obtained the full limit allowed. When the excellent hunting obtained is better known, together with easy access to the hunting-grounds, I have no doubt that many parties will patronize the district to the north of Stuart Lake, using quarters at the lake as their main base.

The fishing, as in most parts of Northern British Columbia, is usually very good. In the larger lakes char, whitefish, and trout can be obtained either by rod and line or by troll, while in the creeks and rivers the usual species is rainbow trout and Dolly Varden.

GENERAL.

During the past few years the country between Vanderhoof and Prince George and extending north and south of Nechako River has opened up rapidly, more so the country to the north of the river. Many new settlers have come into the country, especially from the Prairies, and while a number have left, the steady influx more than offsets those who have left. A great aid to the rapid settlement of the country is good roads, and although there are not nearly enough at present, yet within the past year or so most of the main roads have been improved for motor and heavy vehicle traffic, while branch roads have been built into the more settled areas, giving fairly easy access to the nearest town or railway-station.

A great aid to the farmers has been the cheap stumping-powder supplied by the Government through Farmers' Institutes. Previously the cost of powder was almost prohibitive and many farms that would have been cleared of the heavy stumps lay idle, but under the present arrangements the purchase of powder is now within the reach of most settlers, and most of them make full use of it.

To the present the easiest crop to dispose of is timothy-hay, as the numerous mills and logging camps along the Canadian National require a steady supply. As the camps purchase by the car-load it is necessary to properly bale the hay and have car-load lots for sale, as the larger camps do not purchase in small quantities. Some farmers make the mistake of putting up swamp or wild hay for sale, but as a rule this cannot be sold in quantity unless there is a big shortage of good timothy-hay, and the price obtained for it is about half the price or less than that paid for timothy, with the cost of harvesting and marketing the same.

EXTRACT FROM THE REPORT OF R. W. HAGGEN.

DATED DECEMBER 1ST, 1924.

[Mr. Haggen was employed in 1924 by the British Columbia Government in making surveys in the valleys of the Goat, Bowron, and Cottonwood Rivers.]

A number of years ago, probably in the latter seventies, a trail was built from Barkerville, then the main trading-town of the Central Interior, to the Fraser River, via Bowron (Bear), Indianpoint, and Isaacs Lakes, Wolverine Creek, and Goat River to the Fraser River. In those

days there was a considerable quantity of fur caught in the country tributary to the Upper Fraser, and Barkerville, about 80 miles distant from the mouth of Goat River, was the most convenient point at which to outfit; there was also, at a later date than the Cariboo gold-rush, a small rush to Goat River, the gravels of which carry values from Diggings Creek to the confluence with the Fraser, a distance of some 10 miles.

The old trail was used by prospectors and trappers and kept in passable condition, until, with the advent of the Grand Trunk Pacific Railway, the points along the Fraser River became the outfitting-posts of the district, and since 1914 it is doubtful if any pack-horses were taken over the trail.

GOAT RIVER VALLEY.

Goat River Valley itself is heavily timbered and contains no agricultural land, with exception of a little at the mouth that may be used in the future. From the mouth of the river to Milk River, 11 miles, there is a heavy growth of hemlock, spruce, and cedar, the latter almost invariably being hollow. The valley is narrow and the hillsides steep. Above Milk River there is no cedar, its place being taken by balsam; while the trees, which are frequently 4 and 5 feet in diameter between Milk River and the Fraser, are much smaller, not, as a rule, exceeding 12 to 18 inches. Here, also, the mountains are steeper and higher, rising above timber-line, and in many places the sides are swept by avalanches.

One is diffident about expressing an opinion concerning the mining possibilities. Above Milk River there is no gold along the bars, but between Milk River and the Fraser the gravels and schists carry values on the east side, but no one who has worked there in recent years seems to have made wages. All work has been by primitive methods, either rocking or sluicing with only a small head. The whole valley is filled with boulders, which adds greatly to the cost of mining, but from information gleaned the yardage values of the gravels must be good. During the past season a well-known mining engineer made an examination of leases held near the mouth of Boulder Creek, 7 miles up Goat River.

Goat River Valley is rather disappointing as a game country. At the mouth moose are quite plentiful, while there are some caribou and deer on the higher mountain-levels, and, of course, goat near the summits. There are a few bear, very few birds, and practically no fish; the most common animal is the porcupine, the Goat River variety being more depredatory, stupid, and determined than any I have encountered. Fur-bearing animals do not appear numerous, but there are some marten, weasel, mink, and beaver in the locality.

There are few, if any, places in the Interior of the Province where there is a heavier precipitation than through this pass. During the season we had very few days on which there was neither rain nor snow, and there were several spells of heavy, continuous rain; two of these brought Goat River and its tributaries up to the spring level, badly hampering the survey operations and entailing the destruction of a valued transit, and very nearly a fatality. With the continued rain and the sodden condition of everything, anything that could be damaged by dampness was damaged; the trail, except where it was on stone or shale, became a quagmire, while every one developed into a pessimistic crank. Looking back on it, I must express appreciation to the members of the party for staying with it: probably this was in a measure due to the fact that for three weeks we were fairly marooned, Goat River and Milk River barring the return to the Fraser and Macleod River sweeping over the trail ahead.

Twenty-six miles from the mouth of Goat River the trail leaves the river at Summit Creek and follows through a wide, swampy pass, the summit of which is about 40 feet higher than Goat River, the elevation being 3,727 feet. A mile from Goat River Wolverine Creek is reached, this being a tributary of the North Fork of Quesnel River, and the trail follows the valley to Isaacs Lake.

Through the Summit Pass there are open swamps, and in the late summer and fall there is good feed for horses in this pass. Several slides from the high mountains on the west sweep over the flat, and there must be deep snow during the greater part of the year.

The valley of Wolverine Creek is wider than that of Goat River and the creek has a somewhat steeper fall. There is a very fair stand of spruce, balsam, and hemlock in the valley. From the mouth of Wolverine Creek it is about 38 miles to Barkerville, 14 miles being by trail and 24 by road.

ISAACS AND INDIANPOINT LAKES.

Isaacs Lake, the most northerly of the circle of lakes at the head of Swamp and Bowron Rivers, is some 20 miles long and about $\frac{1}{2}$ to 1 mile in width. It is a pretty lake, with mountains rising above timber-level on either side, and there is a good stand of timber, mostly spruce, cedar, and hemlock, on the hillsides. No cruise that would enable an estimate to be given of the timber available has yet been made in this section. From Isaacs Lake to Indianpoint Lake there is a portage of about 1 mile through a low pass. Indianpoint Lake drains through Indianpoint Creek to Bowron River, and from it to the outlet of Bowron Lake to Bowron River is 7 miles.

This circle of lakes is one of the best hunting-grounds in the Province, moose, caribou, black and grizzly bear, and goat being numerous, while there is excellent fishing in several places; the mouth of Wolverine Creek being one of the best spots.

A LAKE TRIP.

A trip well worth taking for either hunters or sightseers is the round of these lakes. A boat can be taken from the foot of Bowron Lake by road to Kibbee Lake; then snaked along the trail to Indianpoint Lake, 7 miles. This lake is about 5 miles long, with a trail along the length. From the east end of Indianpoint Lake there is a portage of about 1 mile over a good level trail to Isaacs Lake. Isaacs Lake is about 20 miles long, draining into the North Fork of Quesnel River. The river is followed, with some portages, for about 2 miles into McLeary Lake, a beautiful body of water, but of no great size. From McLeary Lake to Long Lake the river is again followed, and there is an easy channel from Long Lake to Sandy Lake. From Sandy Lake the river, creeks, and swamps are followed, and a portage lies between this drainage and Spectacle Lake, on the Bowron River. From Spectacle Lake there is the connection of Upper Bowron River, quite navigable, to Bowron Lake and the point of commencement. This trip round the lakes is especially to be recommended to camera-hunters, who can do their hunting in the summer when the weather is such as to make boat-travelling most agreeable. It is not uncommon to see from thirty to fifty moose on this round trip, while the whole journey is one of unusual beauty. These lakes are a favourite resort for big-game hunters, a number of whom visit the locality every fall.

While this section used to be very popular for trapping, the catches latterly have been small, marten, beaver, etc., having been pretty well trapped out during the era of high prices.

This whole locality is well timbered and, with the large body of navigable water, would be good for economical logging. Of course, at the present time, there are other timber areas close to transportation, and no immediate development is to be looked for. However, it is not to be overlooked that Goat River offers a good route for a line of possible traffic development, the distance from the railway at the mouth of Goat River to Isaacs Lake being just under 35 miles, and the grade from the summit down Goat River being just about 1 per cent. From the summit to Isaacs Lake via Wolverine it would be about 1.5 per cent. Taking this in conjunction with the large area of timber in the whole Quesnel River watershed, it is not unbelievable that the section may justify opening up.

BOWRON RIVER VALLEY.

Bowron River Valley on this section is rather wide, the flats averaging from $\frac{1}{2}$ to 1 mile and the hills on either side not attaining any great height. The bottom is fairly level, but swampy in many places. Vegetation consists of spruce, jack-pine, and poplar of no commercial value. While there are several flats with a sandy loam soil, agricultural efforts in the valley, carried on in a desultory manner for a number of years, have met with but little success owing to the prevalence of summer frosts. Apart from raising hay for a few head of stock, there is no inducement to do any more than raise a garden, as there is no market available, Barkerville being amply served from Quesnel.

The settlers who are in this section are all guides and trappers, and the raising of feed for pack-horses or of garden-truck for the house is incidental to their regular occupation.

To a point about 3 miles below Lot 429, or 14 miles from Bowron Lake, Bowron River is quite sluggish and easy to navigate with boats: from that point it becomes rocky and hazardous and is only used in case of necessity.

From Bowron Lake a road leads 6 miles down-stream to Duffy's, and from there an excellent trail leads to Cochrane's, on Indianpoint Creek; in fact, I took my car 2 miles down this trail during the season.

Indianpoint Creek is a stream about 1 chain in width and flows in a nice wide valley. Hunters who were there during the fall had very good success on this and Dominion Creek. J. D. Cochrane, whose home is on Lot 9518, is a very successful guide and a naturalist. Latterly he has been devoting a good deal of time to taking moving pictures of game in their natural haunts. He and Captain McCabe, of Bowron Lake, have some magnificent game pictures taken in this area.

EXTRACT FROM THE REPORT OF L. S. COKELY.

DATED DECEMBER 18TH, 1924.

[Mr. Cokely was employed in 1924 by the British Columbia Government in making a subdivision of the dry bed of Cranberry Lake.]

CRANBERRY LAKE.

My next work was the subdivision of the bed of Cranberry Lake, which has dried up. This lake is 200 miles north of Kamloops, right on the summit between the McLennan and the Canoe Rivers, due south of Mount Robson. The McLennan is a tributary of the Fraser and the Canoe a tributary of the Columbia River. Before the railway was built it was possible to take a canoe up the Fraser and McLennan Rivers, portage about 3 miles to Cranberry Lake, proceed up Cranberry Lake, and portage another 2 miles to the Canoe River, and proceed down the Canoe and Columbia Rivers.

In recent years Cranberry Lake has been gradually drying up and at present it is practically dry. This has been brought about by two reasons: First, the killing-off of the beaver which kept the outlet dammed; and, second, by diverting the waters which formerly flowed into the lake for irrigation purposes and returning same to the Canoe River. The western portion of the lake-bed contained many very old stumps, which would indicate that this part was not always a lake but had been included through the work of the beavers.

The area of the lake is about 750 acres, and this should prove first-class hay land as soon as the soil is sweetened. The soil consists of silt, with an occasional strip of sand. There are no stones. Twenty lots were laid out which average 40 acres; they are all very level.

The rainfall is light and in the surrounding territory irrigation has to be employed, but I hardly think irrigation would be necessary on this area, as the soil is heavy compared to the adjoining land, which has a light soil, with much sand and gravel, and which dries out very quickly. However, should irrigation prove advantageous, there are several streams which could be utilized.

As the altitude is over 2,500 feet, frost is liable to occur in any month, so that agricultural possibilities are accordingly limited. Very little land is under cultivation here, but where water is available the land appears productive.

The Canadian National Railway passes about a quarter of a mile from the lake and the nearest station is Swift Creek, which consists of a post-office and section-house. There are a very few scattered settlers, but none are farming on an extensive scale.

The country was never heavily timbered and during the past few years most of the available timber has been cut or destroyed by forest fires; one bad fire occurred this summer which destroyed several square miles of timber. The timber consists of jack-pine on the flats and spruce, hemlock, cedar, and a few scattered firs on the side-hills.

Not much mineral wealth is showing in this locality, but one of the largest mica-mines in the Province is located a few miles to the west, although it has not been operated lately.

Game is very plentiful; deer abound, also moose and caribou. On the higher ridges goat can be secured and back from the railway grizzly bear range. One day while working a bear appeared followed by three cubs, which is a rather unusual sight.

Owing to the high altitude the summers are cool, with little rain, and the winters are rather severe, with snow to a depth of about 2 feet.

EXTRACTS FROM THE REPORT OF A. O. WHEELER.

DATED JANUARY 9TH, 1925.

[Mr. Wheeler was employed in 1924 by the British Columbia Government in locating the boundary between the Provinces of British Columbia and Alberta from the Yellowhead Pass to the north.]

MEMORIAL MONUMENT.

It was decided that a special memorial monument to the boundary survey should be erected at the summit of Robson Pass. The Alpine Club of Canada was holding its annual camp there, so it was arranged to have the unveiling ceremony take place on the morning of July 31st while the camp was in session, and to hold the annual meeting of the club the same afternoon.

This arrangement was a most appropriate one, for the work of the boundary survey has been of very special interest and benefit to the club and to its widely scattered membership, owing to the fact that the watershed of the main range of the Rockies, which constitute the boundary between the two Provinces, lies along the crests of the highest peaks of the range, and that the mapping of these areas and consequent distribution of information concerning them has been of very great value to all visitors, or prospective visitors, to the Canadian Rockies. So much so has this been the case that map-distribution in connection with the boundary survey has very greatly surpassed the original intention, and many of the sheets illustrating the more attractive parts have gone through several editions owing to the demand for them, and have proved of great advertising value to the tourist business of the mountain regions quite apart from the survey of the boundary.

At the unveiling ceremony the Government of British Columbia was represented by G. R. Naden, Deputy Minister of Lands, and J. E. Umbach, Surveyor-General; the Government of Alberta by P. N. Johnson, Director of Surveys; the Dominion Government by P. N. Wallace, Boundary Commissioner during the first two years of the survey, and by F. A. Williamson, Deputy Commissioner of the National Parks Branch of the Department of the Interior; the Geodetic Survey of Canada by H. F. Lambart, in charge of the parties of the Geodetic Survey collaborating with the boundary survey; the Canadian National Railways by Osborne Scott, General Passenger Agent; and the Canadian Pacific Railway by A. O. Seymour, General Tourist Agent.

Unfortunately, R. W. Cautley, Interprovincial Boundary Commissioner, representing the Dominion Government and the Government of Alberta, was at the time working upon the boundary in wild country far to the north and it was not possible to get word to him in time to attend the ceremony, but A. J. Campbell, D.L.S., who had been associated with Mr. Wheeler's division of the survey as chief assistant in charge of the photo-topographic work since the beginning, arrived the same day. The monument was unveiled by Mrs. Campbell as a tribute to the excellent work done by her husband in such connection.

The erection of the monument lay within the province of Mr. Cautley's division, but owing to his forced absence the work was done under Mr. Wheeler's superintendence, with the very efficient assistance of Mr. Lambart and A. H. MacCarthy, the latter a member of the Alpine Club, who had had practical engineering experience as a commander in the United States Navy.

The ceremony was an impressive one. The towering magnificence of the mighty snow-clad mass of Mount Robson, rising directly above, gave solemnity and dignity to the scene. The surroundings were certainly unique. The great mountain whose crest, golden in the fitful sunshine and then obscured by passing clouds, was a full mile above us, close by the glorious blue waters of Berg and Adolphus Lakes, and all around wide-spreading snow-fields and tumbling ice-falls between precipitous rock ramparts, the crowd of picturesquely garbed mountain-climbers, men and women, assembled about the monument, which occupied the centre of a broad, bare shingle flat, brought vividly home to us the magnitude of the works of Nature at their origin and the wonderful heritage we possess in this mountain wilderness of unsurpassed scenic grandeur.

Mr. Naden opened the proceedings with a few appropriate remarks, followed by the Surveyor-General of British Columbia, who complimented the Commissioners upon the successful completion of a distinctly arduous undertaking. Acknowledgments were made by Mr. Wallace and Mr. Wheeler. Then, as the Union Jack fluttered from the unveiled monument, the cook's tosein

sounded at the Alpine Club camp and a passing rain-storm scattered the assemblage to well-earned refreshment after its labours.

The monument erected did more than memorialize the boundary survey. On the Alberta side an inscription-plate recorded the name of the late Edouard Deville, who for more than forty years had been Surveyor-General of Canada, and under whose direction the work of the boundary survey had been carried on since its inception in 1913—a man and a scientist, to whom Canada owes most largely her magnificent system of land surveys, and also the introduction of the method of photo-topography, a method so well suited to her mountain areas and so successfully carried on in mapping them. It is fitting that his name should be on record at a place where their grandeur reaches a climax.

SHEEP CREEK PASS.

Although not a boundary pass, owing to the fact that the 120th meridian lies $1\frac{3}{4}$ miles east of its summit, it is one of importance for the reason that the intersection of the said meridian with the watershed of the main range occurs on the crest of the so-called Mount Haig, which mass forms part of the southern confines of Sheep Creek Valley. Owing to duplication elsewhere it is suggested that the name be changed to "Intersection" Mountain. The pass is also of importance on account of the base-line of the Geodetic Survey triangulation, which is located close to the summit, having been connected with the 120th meridian at the western extremity, and with the longitude pier established by Mr. McDiarmid at the eastern extremity of the base.

It is here a beautiful, wide, open valley extending from the summit in broad meadow lands for a distance of 7 or 8 miles. A number of small lakes and ponds scattered over the valley-bottom add to the picturesque character of the scenery, and groves of spruce and pine along the margins give the whole a park-like appearance that is very attractive.

JARVIS PASS.

Beyond Sheep Creek Valley northward the line of travel follows a tributary of Sheep Creek over a divide to the headwaters of Porcupine River, flowing from Cecilia Lake (Surprise Lake, local name) to a junction with another source flowing from Porcupine Lake, both exceedingly picturesque sheets of water of considerable size as lakes go in that part of the mountains. A short distance below the junction the main stream is joined by a source from Jarvis Pass. This pass is densely timbered and holds a chain of six or more lakes of varying size. While a pass of the watershed, its summit lies in British Columbia about 8 miles west of the 120th meridian, and does not specially concern the boundary survey. The McGregor River apparently flows westward from these lakes.

The Porcupine Valley is here a broad trough of several miles in width. It shows areas of spruce and pine forest-growth, intersected by numerous small meadow-land opens. Much of it has been burned over and there are wide stretches of *brulé*. The Porcupine River so near its source is a shallow swift-flowing stream about 100 feet wide. It soon assumes more considerable proportions.

BEYOND THE PORCUPINE.

Continuing northward, Wolf Pass (local name) leads to the head of Narraway River, which flows eastward on the north side of Torrens Mountain. Travel by the survey, however, was made by way of a tributary of the Porcupine, over a divide to the headwaters of Torrens River, the Eastern Branch of Narraway River, which it joins north-east of Torrens Mountain; then by way of Saxon Creek to the Narraway at a point not far west of the 120th meridian. The timber-distribution is of an open character and travel can be made in almost any direction by the majority of the many valleys traversing the terrain.

North of the Porcupine the hills get lower and of more rounded form. They are of an open shaly formation and the timber reaches to near their summits. The valleys between are more closely timbered and meadow openings are few and of small size. The country, north and east, soon merges into densely timbered foot-hills and then to flat country beyond, where burned areas are predominant.

LAST GROUP OF HIGH MOUNTAINS.

Between Sheep Creek Pass and Jarvis Pass in British Columbia rise the last high group of mountains. Of this, Mount Sir Alexander (Mackenzie), 10,740 feet, and Mount Ida, 10,472 feet above sea-level, are the outstanding features. There may possibly be another of the group

above 10,000 feet, but the majority are little over 9,000 feet or less. Northward beyond this group the hills soon get lower and trend well to the north-west. The outstanding peaks are prominent more on account of their isolated positions and to the lower altitude of the timber-line than to excess in elevation.

GAME AND FISH.

The open hillsides and meadow-land valleys of the area adjacent to Sheep Creek are a paradise for big-game hunters. Caribou and smaller deer are plentiful and moose are seen quite frequently. Brown bear are in the woods and grizzlies frequent the rocky cirques and passes near or above timber-line, where the Parry marmot (mountain-gopher, so called) lives in colonies on the patches of alpine meadows and affords them good hunting. Mountain-goat are frequently seen on the rock-faces of the mountains; and a little farther east, among the lower shale hills in the Sheep Creek and Porcupine River country, the bighorn or mountain sheep are abundant.

Many hunting-parties visit this section of the country during the late fall, when the hunting season is open, and seldom go away dissatisfied. The dry grassy meadow lands, interspersed with groves of trees, and the open hillsides furnish ideal hunting conditions and most attractive camping-grounds.

No fish were caught by the survey party. Although trout are said to inhabit the streams lower down, they do not seem to frequent the upper waters so near to their source in sufficient quantity to make it apparent.

GENERAL REMARKS.

The timber-distribution is practically the same as already reported. Timber-line may rise to 6,300 feet or thereabouts; more definite information will be available when the season's elevations have been worked out. On the Alberta side the open meadow lands are interspersed with groves and patches of small-sized spruce, pine, and balsam at the higher altitudes. North of Sheep Creek and as the foot-hills are approached eastward the timber becomes more densely distributed.

No large bodies of timber of special commercial value were noticed. On the British Columbia side, directly the watershed is crossed, the valleys become densely timbered, and, presumably, by timber of a larger and more valuable dimension. Fir and cedar would also in all likelihood soon make their appearance. Burned areas were seen in the Porcupine Valley and in Sheep Creek Valley east of the meadow lands, also in the vicinity of Torrens Mountain and at a few other places, but, taken as a whole, the proportion is small.

North of the jack-pine valleys, once the Great Shale Ridge is passed, travel becomes easy for horses, except for the constant ascent and descent of the big hills. Owing to the open nature of the country horses can be taken in almost any direction through the valley-bottoms and over the intervening divides, a fact which greatly facilitated the work of the survey and was distinctly a contrast to the difficulties encountered south of the Big Shale Ridge, which borders the valley of the West Branch of the Jackpine River (Curly Creek) on the north.

EXTRACT FROM THE REPORT OF H. McN. FRASER.

DATED APRIL 14TH, 1925.

[Mr. Fraser was employed in 1925 by the British Columbia Government in making a traverse of the McGregor River and Torpy Creek.]

DESCRIPTION OF TORPY CREEK.

Torpy Creek flows into the Fraser at a point about 5 miles east of the town of Dome Creek, on the Canadian National Railway, its mouth being accurately shown on the map.

The trend of the valley of this creek is north and south for a distance of about 5 miles from its mouth, where it is divided into what are known locally as the West Fork and Walker Creek, the West Fork being the larger, its valley extending in a north-westerly direction for some 25 miles. The river in this valley is very crooked and sluggish.

Walker Creek swings almost due east from the confluence for a distance of about 1 mile, when it again swings north and continues so for a distance of 4 miles to the mouth of a small stream, which I shall call Goodson Creek, at which point the trend of the main stream turns north-easterly, looking up-stream, and extends in that direction for a distance of about 20 miles. Walker Creek flows for a distance of 16 chains through a box canyon having an average width of 80 links. The walls of the canyon are composed of shale and rise perpendicularly to a height of from 60 to 80 feet, its lower end being situated about 1 mile up-stream from the forks.

The main stream and both forks of Torpy Creek are easily navigable for canoes and small boats, except in the winter, when they are frozen over, and in the spring freshet. At other times an Evinrude engine will easily propel a small boat against the current.

TOPOGRAPHY.

The north-west corner of Lot 7653, the point from which the traverse commenced, is $2\frac{1}{4}$ miles north from the mouth of the river, the valley at this point being about $1\frac{1}{2}$ miles wide. On the west side the valley is bounded by low rolling hills, about 200 feet high, which come right down to the river. These hills continue up-stream for a distance of 7 miles and gradually become rougher and steeper till they terminate in the hills bounding the valley of Goodson Creek, at which locality they are 600 to 800 feet high, and are very rough and precipitous.

On the east side the valley is bounded by steep mountains which rise to a height of about 4,000 feet above the river and continue up-stream for a distance of 6 miles, where they are broken by the valley of a stream which flows into Walker Creek. On the north side of this stream the mountains are much higher and are topped by rugged peaks which rise to a height of about 6,000 feet.

TIMBER.

The hills bounding Torpy Creek on both sides are densely timbered with small spruce, scrubby balsam, and cedar, while the valley-floor is also densely timbered with spruce, balsam, cottonwood, poplar, alder, and birch. The spruce and balsam are of fair quality, ranging from 8 to 24 inches in diameter.

On the west side, as the hills become steeper, the timber on them becomes scrubbier, and from 2 miles above the forks to the west side of the valley of Goodson Creek it is of no commercial value.

The hills on the east side are completely timbered until they are broken by the draw which comes into the main valley about a mile below Goodson Creek. Above this draw the mountains appear to be sparsely timbered to a height of about 3,500 feet, timber-line being clearly discernible.

SOIL.

The soil in the valley of the Torpy is composed of silty loam, while the subsoil is a mixture of bluish clay and gravel.

Messrs. Goodson and Haines, who have pre-emptions at the forks of the river, assured me that the soil is productive of very excellent crops, such as potatoes, carrots, turnips, and other vegetables, also a large variety of small fruits, such as loganberries, raspberries, strawberries, gooseberries, and blackberries.

DESCRIPTION OF GOODSON CREEK AND THE PORTAGE TO THE MCGREGOR RIVER.

Goodson Creek flows generally south from its source and is about 5 miles long. The valley through which it flows is about 2 miles wide and is bounded on both sides by a range of timbered hills, which are from 1,000 to 1,200 feet high. The stream is small and deep and very crooked and is navigable for small boats for a distance of 3 miles. Along the foot of the mountains on both sides of the valley are rather extensive muskegs, those on the east side extending through to the McGregor River. There is no timber of commercial value on the muskegs.

The height of the summit of this pass between Torpy Creek and the McGregor River is about 300 feet. The slope from the Torpy Creek side is gradual and the summit is about $1\frac{1}{4}$ miles from the McGregor River. The descent from the summit to the McGregor is gradual until within 15 chains of the river-flats, at which point the slope becomes very steep, the drop from the benches to the flats in the valley-bottom being about 250 feet.

TIMBER.

The timber in this pass consists principally of spruce and balsam, with here and there a sprinkling of stunted cedar. The spruce and balsam will go between 15,000 and 20,000 board-feet to the acre over the timbered area; the spruce being quite considerably in excess of the balsam.

SOIL.

The soil is a leaf-mould mixed with silty clay, and the subsoil seems to be similar to that in the Torpy Creek Valley.

DESCRIPTION OF THE MCGREGOR RIVER VALLEY.

The McGregor River at the locality where the traverse enters it is split into a number of sloughs and islands, the distance between the banks on the north and south sides being about 20 chains. These sloughs and islands continue down-stream for a distance of $3\frac{1}{2}$ miles, and from there down to where the traverse was completed the width of the river varies from $3\frac{1}{2}$ to $5\frac{1}{2}$ chains, and it is contained between well-defined steep banks, varying in height from 8 to 40 feet. Its course is very crooked as it crosses and recrosses the valley many times. Its flow is not very fast, averaging probably about 3 miles per hour at normal stages of the water and not exceeding 6 miles per hour at any point throughout its length as traversed this year. The river is easily navigable for small boats for a distance of about 75 miles above the upper canyon.

The valley of the McGregor is about $1\frac{1}{2}$ miles wide, its general trend being north-westerly. On the south side it is bounded by a range of unbroken timbered hills, varying in height from 800 to 1,200 feet. These hills extend down-stream for a distance of 12 miles, where they are broken by the valley of a small stream which enters the valley in that vicinity. From there down the hills become more rugged and rise to a height of from 1,500 to 2,000 feet.

There are a few small streams entering the McGregor from this side, but only one of these has a valley worthy of note, the others falling very rapidly from short, steep draws. This creek meets the main river about 10 chains up-stream from the 49-Mile post. Its valley, which is about 60 chains wide, appears to extend some 6 or 7 miles back from the McGregor and is densely timbered with a good quality of spruce and balsam. Between the 52- and 53-Mile posts the valley broadens out, until at the 54-Mile post it has become about 3 miles wide and is flanked on each side by low, rolling, densely timbered hills from 200 to 400 feet high.

On the north side the valley is bounded by a range of timbered hills about 2,000 feet high, with a range of high rugged mountain-peaks beyond. These mountains persist throughout the whole length of the traverse. There are five streams flowing into the McGregor on this side, their mouths being near Mile-posts 21, 24, 28, 40, and 46. These streams all approach the river through steep, narrow draws.

The valley-bottom is flat and contains some large muskegs, which are sparsely timbered with stunted spruce and pine. There is, however, sufficient fall between these muskegs and the river to allow for their drainage.

From the 23-Mile post, for a distance of about 10 miles up-stream, there is conclusive evidence that the valley has been recently inundated to a depth of 9 or 10 feet. This has been caused by the ice jamming between high clay cut-banks which lie in a sharp bend just up-stream from Iron Post No. 23. The ice-jams have caused the water to back up until the valley has flooded for some distance from the banks of the river. The movement of the flood-water has not been fast, as there is no excessive amount of fallen timber in that locality.

TIMBER.

The McGregor Valley, with the exception of the muskegs, is densely timbered with spruce, balsam, birch, and alder, with here and there a few cottonwood. The merchantable timber extends up the mountain-sides to a height of 500 or 600 feet. The spruce timber is of good quality, ranging from 8 to 30 inches in diameter, and is considerably in excess of the balsam, a great deal of which is of poor quality, being badly affected by butt-rot. The timbered area of the valley will run about 14,000 board-feet to the acre in spruce and balsam.

Mr. Harvie, who was attached to the party as representing the Forestry Department, made a reconnaissance of the valley for a distance of 15 miles up-stream from where the traverse

enters it. He reported that for 10 miles up the timber was good and that the river was split into sloughs and islands for about 4 or 5 miles. He also reported the presence of extensive glaciers in the mountains, the nearest one to the Torpy Creek Pass being about 14 miles distant. These glaciers are situated in the heads of draws high up in the mountains and extend up-stream as far as the eye can see.

SOIL.

The soil in that part of the McGregor River Valley adjacent to the river is composed of silty loam, while the subsoil is similar to that in the Torpy River Valley.

GAME.

The territory drained by both the Torpy and the McGregor Rivers abounds in game, both big and small, such as moose and caribou, which are plentiful, and I was told by the trappers that black, brown, and grizzly bears are also very plentiful in their season. There are also such fur-bearing animals as fisher, marten, mink, lynx, coyotes, wolverine, weasel, beaver, and timber-wolves. The latter are quite numerous and travel in large bands. In fact, in one band which I saw there were twenty large timber-wolves. These animals are not bold as far as man is concerned, but they are a very decided menace to the moose and caribou, and it is my opinion that if they become much greater in numbers it will only be a few years before the moose and caribou will be thinned out to a very large extent. On the McGregor River one frequently finds moose carcasses which have been wantonly killed by the wolves, as they very often leave the animals practically untouched after killing them.

Wild ducks and geese are very abundant along the sloughs and marshes contiguous to both rivers.

The fishing in these rivers and their tributary streams is excellent, as the rainbow and Dolly Varden trout are very numerous.

PRECIPITATION.

Precipitation in the Torpy Creek basin is moderate, there being only about 5 feet of packed snow on the valley-floor at the end of March, and I was told by Messrs. Goodson and Haines that the rainfall in the summer is correspondingly moderate.

Precipitation in the McGregor River basin is much greater, as the depth of packed snow was about 9 feet at the end of March, and I understand that the rainfall is heavy.

The snowfall throughout this country has been much in excess this year of what it ordinarily is, and unless the spring thaw is retarded by cool weather on the headwaters of these and other rivers tributary to the Fraser, I think it safe to predict higher water on the lower reaches of the Fraser this year than for many years past.

EXTRACTS FROM THE REPORT OF J. A. F. CAMPBELL.

DATED OCTOBER 26TH, 1925.

[Mr. Campbell was engaged in 1925 by the British Columbia Government in making surveys in the vicinity of Stuart River.]

STUART RIVER.

Stuart River flows from Stuart Lake near its eastern extremity and empties into the Nechako River close to Finmoore, a station on the Canadian National Railway some 50 miles west of Prince George.

Simon Fraser, the discoverer of the river, followed it to the source, and there in 1806 established the trading-post of Fort St. James, naming the lake Stuart Lake after one of his lieutenants. It is from Stuart Lake that the river takes its name, as Fraser was under the impression that he was on the headwaters of the Columbia River.

Until the building of the Grand Trunk Pacific, now the Canadian National Railway, Stuart River played a large part in the transportation of supplies to Fort St. James and posts in Northern British Columbia. In the early days of last century supplies for the various posts in the north were sent from Eastern Canada by wagon and water, portaged on to the headwaters

of the Fraser River and then up the Nechako and Stuart Rivers. Later, supplies were forwarded from Fort Vancouver, in what is now the State of Washington, via Kamloops, the last stage of transportation being on the Stuart River. When the western headquarters of the Hudson's Bay Company was transferred from Fort Vancouver to the present site of Victoria the old route was followed, and until the completion of the Grand Trunk Pacific Railway, Fort St. James maintained its hold as the principal distributing centre of the Northern Interior, with Stuart River as the main artery of travel.

For a few miles below the lake the river is fairly rapid and one small canyon is passed. From that point down-stream for a distance of 40 miles the river is slack, with a depth of 4 to 10 feet. The flow was noted at various points and the average speed was found to be 1 mile per hour, at some points not over three-quarters of a mile per hour being recorded. The slack water ends near the mouth of Mandalay Creek, and from there to the mouth of the river, a distance of 25 miles, the current is swift, with many rocks and shoals. The river can be navigated for its entire length, although the lower end is difficult in low water. During the summer cabin launches of 30 feet in length went from the mouth to Stuart Lake, and, outside of the fast water on the lower reaches, no trouble was experienced at any point.

LAND SURVEYED ON THE STUART RIVER.

A flat extends from the river back to the river-bluff and varies in width from $\frac{1}{4}$ to $\frac{3}{4}$ mile. The bluff rises sharply from the flat to a height of 200 to 300 feet. On the flat the prevailing growth is poplar and pine, usually well scattered and in many places so open that the land could almost be classed as meadow. A strip of large spruce, 15 chains wide and $\frac{3}{4}$ mile long, parallels the river through Lots 5127, 5128, and 5129. With the exception of this strip the timber is small, the pine and poplar seldom exceeding 8 inches in diameter.

A noticeable feature along the river is the absence of gravel. Instead of the usual gravel-bars found on most rivers the size of the Stuart, the bars are formed of deep black silt soil. Due to the slackness of the current, grass takes root on the bars, and for miles along the river there is a strip of wild grass 2 to 6 chains wide. As the water lowers the growth is very rapid and in a very short time the grass has attained a height of about 4 feet. A large amount of the grass is cut by near-by settlers and after the hay is cured it is floated down-stream on rafts to the farms.

The river-flats are free from gravel, the soil being a deep brown or black silt, sustaining a dense growth of wild grass, peavine, vetch, and various weeds. The clearing for the most part is light; a very good idea of the quickness in clearing land is the pre-emption held by A. Snyder on Lot 2759r, who slashed 60 acres, burned 20 acres, and has started stumping, all between the fall of 1924 and June, 1925, and the general clearing of the land surveyed is lighter than this pre-emption.

Some miles below Lot 2766r, which is known as Sturgeon Point, there are a dozen or more settlers. All have land under cultivation, the largest cultivated area being on the Mandalay Farm on Lots 2371 and 8405, where there is about 200 acres cleared and over 100 acres cultivated, together with modern buildings and farm machinery. The other settled farms have between 5 and 40 acres cultivated, while the slashed clearing on these farms usually is double the cultivated area.

Expired T.L. 4253 was surveyed into four lots, varying from 130 to about 160 acres. At one time this limit had a heavy stand of spruce, but some years ago a fire killed all the timber. Most of the land is on the river-flat, the soil is very fertile, and the clearing of the dead timber not difficult. As an experiment I had one of the party clear some of the land, and without any labour, except setting fires under the dead trees, in six days an acre was made ready for the plough. The actual time spent in lighting and controlling the fires was about eight hours, usually after the party had returned to camp, so that a man spending a few hours a day clearing should be able to clear at least an acre a week.

ROADS.

A good road runs from Vanderhoof to the Stuart River, crossing the river by a bridge between Lots 9248 and 2764r. Half a mile north of the river the road branches, one road going to Mandalay Farm, 5 miles down-river, while the other goes to Margaret Lake. The former road can be used by motor-cars, but the latter is very rough.

The distance from Vanderhoof to the bridge is 26 miles and can be travelled in an hour and a half by car. When the last few miles of road are repaired and regraded the time can be reduced considerably. Four miles south of the river a road turns from the main highway and runs almost directly south to Finmoore, the nearest station on the Canadian National. This road is little used as the northern portion is in bad condition, but the District Engineer has advised the settlers that by next summer the road will be put in good repair. The distance to Finmoore is 13 miles, cutting in half the present trip to Vanderhoof.

TIMBER.

There is a heavy stand of spruce and fir between the Stuart River and Fountain Lake, also on the lakes to the north, Stuart, Takla, etc. During the past season two separate cruising-parties were over the timber, and if conditions warrant it a mill will be built on the Nechako below the mouth of the Stuart, and the timber adjacent to the river and lakes will be logged and driven down-stream to the mill. Besides the timber mentioned, there are numerous small stands close to the river that can be logged with profit by small operators, as the river is easy to drive at all stages of water.

GENERAL.

The Stuart Valley in the vicinity of the above surveys has been settled for the past ten years, but it is only during the last five years that settlers have started to come in any numbers. The first settlers in the valley were J. Hammond and J. W. Hamilton, both of whom have excellent farms under cultivation. It may seem strange, but farmers near Webber Lake, a few miles to the south of the river, have been planting potatoes on Hamilton's farm, as they have been unable to raise a good crop on their own places. There has not been a crop-failure since the valley was settled and a large variety of roots and grains are raised.

Vanderhoof, on the Canadian National Railway, is the market and distributing-point, being the centre of the Nechako Valley trade. A creamery is operated at that point by the British Columbia Department of Agriculture and the town has a number of first-class stores.

At Vanderhoof is a public and high school, and between Stuart River and Vanderhoof there are schools at Chilko and Webber Lake. On Lot 8398 is the Stuart River School. The nearest post-office to the river is at Chilko, about half-way between the river and Vanderhoof.

FUR-FARMING.

An industry that is fast taking hold in the north is fur-farming. Many of the settlers find that an excellent profit can be made in this way. Most of them are not able to pay the high price asked for pedigree stock to start the farm, but they have the advantage over most localities, in that they can trap the foxes and keep the best for the pen. L. H. Davidson, at the Stuart River, besides having a few acres cultivated, has a dozen or more foxes, all caught in his traps, and he intends to keep the best of them for stock-raising and sell the hides of those that are not up to standard. Many other settlers are working on the same principle and are gradually developing a paying business.

EXTRACT FROM THE REPORT OF A. J. BUTTERFIELD.

DATED DECEMBER 29TH, 1925.

[Mr. Butterfield was employed in 1925 by the British Columbia Government in making surveys in the vicinity of Victoria Creek, south of Cottonwood.]

The Victoria Valley in the vicinity of Sundberg's and the lots surveyed by myself consists of about 20 chains of flat bottom land, with side-slopes rising about 300 feet above the creek. The north-easterly slopes are for the most part gentle and clothed with poplar and pine, but the south-westerly side of the valley is steeper and rocky in several places.

From the evidence of Mr. Sundberg's place, which is about 1½ miles from my work, it would appear that to attempt to raise grain, potatoes, or anything susceptible to frost would be futile owing to the prevalent summer frosts. However, Mr. Sundberg has a theory that, although his attempts in that direction have failed in the past, they have all been made in the open valley-bottom and better luck may attend his efforts on the higher ground.

Winter starts in October in this district and continues, with much snow, until the end of April or the beginning of May. This necessitates a very long period of winter-feeding, and although the country is eminently suited for grazing, in other respects the cost of wintering cattle or sheep would be rather high, although to offset this it must be admitted that there is every prospect of raising good hay-crops on the bottom land, where the rich black muck is 3 feet deep.

TIMBER.

The north-easterly slope of the valley is topped with a stand of good timber which I am informed continues to a depth of 4 miles towards Swift River. This timber consists of fir, spruce, and pine and will average from 10,000 to 15,000 feet to the acre. Whether the trees are sound is a matter for conjecture, but decayed hearts in timber are the rule rather than the exception in this district.

GAME.

Moose are extraordinarily numerous in this area, three or four of these animals being observed on several occasions. Mr. Sundberg informed me quite emphatically that he had great difficulty in keeping them out of his hay-crops, as they pay practically no attention to either prayer or gesticulation while engaged in feeding on the fruits of his labour.

Bears appear to be very rare in the area, but coyotes are very numerous. The presence of the latter animals in such numbers constitutes another drawback to sheep-raising, and I have frequently heard the opinion expressed that an increased bounty on these animals during the summer months, when the pelts are valueless, and little or no bounty during the winter would do much to eradicate the pests.

There are several beaver in the various ponds in the valley, but the other fur-bearing animals, with the exception of muskrats, are scarce.

EXTRACT FROM THE REPORT OF J. A. F. CAMPBELL.

DATED NOVEMBER 12TH, 1927.

[Mr. Campbell was employed in 1927 by the British Columbia Government in resurveying lands in the vicinity of Prince George.]

The settlement area lies on the east side of the Fraser River, opposite Prince George, and embraces approximately 20,000 acres, and with the exception of a few sections on the Fraser is on a bench 300 to 400 feet above the river. Most of the area is tillable, but there are portions, especially on the west and south-east, that I would not classify as good agricultural land.

There are fifty-four settlers, most of them with families, in occupation, and immediately adjoining, but outside the area, are another fifteen families, having in the making a very prosperous community. There are two schools, Pineview and Tabor Creek, though at present only the latter is active. The Dominion Government has an experimental and illustration station in operation on Lot 631.

The majority of the settlers have good dwelling-houses, barns, both frame and log, and teams and first-class farm implements are owned by most of them. In the last few years great progress has been made in clearing and cultivation, and taking into consideration that all the present cultivated land had to be cleared, dwellings and barns erected, much credit is due the settlers, as it is two and often three years before a return can be expected, and at first the return is usually very small.

So far the principal crops are timothy-hay and oats, with a small amount of root-crop. It was noticeable that much of the land in hay was being ploughed during the fall to add further acreage for oats and barley. Many of the settlers, instead of marketing their hay, have kept just sufficient for their own stock and have threshed the balance for seed.

The Blackburns, who probably have more land under cultivation than any other settler in the area, have this year added a threshing-machine to their equipment, and at a very reasonable figure contract to do the threshing on the adjacent farms.

The lack of good water in the summer months has handicapped to some extent greater development in the area. Tabor Creek is the only supply of running water to be depended upon throughout the year, and during the summer months it is not of the best quality.

On twenty-seven sections, comprising the southern portion of the area, there are only two wells that give a good supply. One of them, drilled during the past summer on the north-west quarter of Lot 1560, is 85 feet deep, and the other, 20 feet deep, is on the north-east quarter of Lot 1559. A drilling outfit went down 155 feet on the south-east quarter of Lot 1944 and no water was obtained. Most of the settlers on this part of the area obtain their water from Tabor Creek, in some cases hauling $3\frac{1}{2}$ miles, after their temporary supply has failed. The northern part of the area from Lot 631 northwards is more fortunate in obtaining water from wells, though on Lot 957 no water was reached at 50 feet, where hard-pan was struck. With the exception of the land through which Tabor Creek flows, wells are necessary, and I should estimate that the depth required is from 60 to 100 feet.

The main highway, Prince George to Quesnel, passes through the area. It is well gravelled and graded and improvements are constantly being made on it. There are many miles of graded dirt roads which in dry weather are as good if not better than the gravelled roads, though it takes little rain to make them greasy. Altogether there are 35 miles of good roads in the settlement area, including 10 miles of gravelled highway. Most of the roads follow the section boundaries and together with cross-farm roads give an easy access to the various farms.

LIST OF REPORTS.

	PAGE
N. B. Gauvreau, 1891, Northern Portion of Cariboo District	7
J. F. Templeton, 1908, Chilako River	9
S. Williams, 1908, 52nd Parallel of Latitude	10
J. F. Templeton, 1908, Blackwater River	12
H. Fry, 1909, Nazko River	12
J. F. Templeton, 1909, Between Blackwater River and Prince George	13
A. H. Holland, 1909, Clucidz Lake	13
A. J. Coryell, 1910, Upper Fraser River	14
A. W. Harvey, 1910, Upper Fraser River	15
M. W. Hewett, 1910, Near Yellowhead Pass	15
Hermion & Barwell, 1910, Parsnip River	19
J. F. Templeton, 1910, Salmon River	22
H. Fry, 1910, Nazko River	22
A. H. Holland, 1910, Near McGregor River	23
T. H. Taylor, 1910, Parsnip and McGregor Rivers	23
E. C. Green, 1910, Stuart and Salmon Rivers	26
J. H. Gray, 1910, Stuart and Neoslie Rivers	27
J. F. Templeton, 1911, Lac la Hache	27
A. S. Cotton, 1911, Nechako Valley	28
R. Smith, 1911, Canoe River	28
W. G. McElhanney, 1911, Upper Fraser	29
W. Meyerstein, 1912, Stuart and McLeod Lakes	31
A. W. Harvey, 1912, Parsnip River	32
F. Tupper, 1912, Williams Lake	34
W. G. McElhanney, 1912, 124th Meridian	35
A. W. Johnson, 1912, Tete Jaune Cache	38
A. P. Augustine, 1912, Upper Fraser	41
A. J. Campbell, 1912, 52nd Parallel of Latitude	43
J. A. Walker, 1912, Upper Fraser	45
R. W. Haggan, 1912, Prince George, Bowron River, and Quesnel	47
D. B. Morkill, 1912, Upper Fraser	50
P. A. Landry, 1912, Chilako River	52
W. S. Drewry, 1912, 52nd Parallel of Latitude	53
R. W. Haggan, 1913, Fraser River below Quesnel	54
H. D. Allan, 1913, Canoe River	55
C. W. Murray, 1913, South of Quesnel	60
H. F. Garden, 1913, 150-Mile House	62
T. A. McElhanney, 1913, Nazko River	63
D. B. Morkill, 1913, Upper Fraser	67
J. A. Walker, 1913, Upper Fraser	70
D. McDougall, 1913, Eaglet Lake	74
R. W. Haggan, 1914, Quesnel	76
D. B. Morkill and G. S. Boulton, 1914, Eaglet Lake	80
J. A. Walker, 1914, McBride	82
F. P. Burden, 1914, Nechako River	86
T. A. McElhanney, 1912, 124th Meridian	88
A. H. Holland, 1914, South of Fort George	91
C. W. Murray, 1914, Horsefly River	92
R. P. Bishop, 1914, North of Quesnel	94
H. H. Roberts, 1914, Southern Cariboo	98
R. W. Haggan, 1915, Quesnel River	100
A. H. Holland, 1915, Willow River	102
R. W. Haggan, 1916, Quesnel River	102
F. P. Burden, 1916, Eaglet Lake	105
H. C. Black, 1916, Vanderhoof	106
F. Tupper, 1917, Horsefly River	107
R. W. Haggan, 1917, Soda Creek	108
F. P. Burden, 1918, South of Prince George	111
F. Butterfield, 1918, Horsefly River	112
R. W. Haggan, 1918, Alexandria	115
A. H. Holland, 1919, Vanderhoof	120
W. C. Merston, 1919, Nazko River	123
J. F. Campbell, 1919, Summit Lake and Parsnip River	124
R. W. Haggan, 1919, Barkerville	129
W. C. Merston, 1920, Nazko River	132
R. W. Haggan, 1920, Quesnel Lake	134
J. F. Campbell, 1920, South of Prince George	137

	PAGE.
E. J. Gook, 1920, Soda Creek and Quesnel	140
G. R. Bagshawe, 1920, Horsefly and Williams Lake	143
R. W. Haggan, 1921, Cariboo District (various)	145
J. F. Campbell, 1921, Bednesti Lake	148
W. C. Merston, 1921, Nazko River	152
J. F. Campbell, 1922, Cariboo District (various)	154
R. W. Haggan, 1922, Barkerville and Cottonwood	159
W. C. Merston, 1922, Chilcotin Valley	162
A. O. Wheeler, 1922, Interprovincial Boundary	164
R. W. Haggan, 1923, Quesnel Lake	167
J. A. F. Campbell, 1923, Cluculz Lake	170
L. S. Cokely, 1923, Upper Fraser	172
A. O. Wheeler, 1923, North of Yellowhead Pass	174
H. McN. Fraser, 1924, McGregor River	176
J. A. F. Campbell, 1924, Stuart River and Fort George	178
R. W. Haggan, 1924, Goat, Bowron, and Cottonwood Rivers	180
L. S. Cokely, 1924, Cranberry Lake	183
A. O. Wheeler, 1925, Yellowhead Pass	184
H. McN. Fraser, 1925, McGregor River	186
J. A. F. Campbell, 1925, Stuart River	189
A. J. Butterfield, 1925, Cottonwood	191
J. A. F. Campbell, 1927, Prince George	192

INDEX.

	PAGE.
Alexandria.....	6, 50, 51, 56, 58, 60, 79, 80, 108, 109, 110, 115, 117, 118, 119, 122, 110, 111, 153, 168
Alexis Creek.....	22, 37, 63, 118, 123, 124, 134, 162, 163, 164
Albreda River.....	38, 39, 40, 41, 58
Baezaeko River.....	13, 35, 124, 132, 133, 152, 153
Baker Creek.....	54, 78, 80, 115, 116, 132, 133, 153
Barkerville.....	6, 47, 48, 60, 76, 77, 78, 79, 108, 110, 120, 129, 130, 131, 136, 140, 142, 159, 160, 161, 180, 181, 182.
Beaver Creek and Lake.....	60, 61, 92, 93, 99, 108, 109, 140, 141, 144, 145, 146, 147, 161
Bednesti Lake.....	13, 14, 106, 107, 121, 122, 148, 149, 150, 151
Bella Coola.....	6, 31
Blackwater River.....	6, 12, 13, 35, 36, 37, 94, 96, 111, 124, 132, 137, 139, 143, 146, 147, 167
Bowron River and Lake.....	5, 15, 16, 17, 47, 48, 49, 75, 79, 81, 130, 131, 159, 160, 161, 180, 181, 182
Canim Creek and Lake.....	43, 44, 53
Canoe River.....	5, 18, 28, 29, 38, 39, 41, 58, 59, 60, 158, 183
Cariboo Lake.....	134, 135, 136, 148
Cariboo Road.....	5, 6, 43, 57, 60, 79, 97, 98, 99, 109, 110, 117, 118, 129, 141, 142, 148, 168
Chilako River.....	6, 9, 12, 35, 36, 37, 52, 53, 63, 122, 137, 138
Chilanko River.....	35, 36
Chilko River.....	11, 121, 138
Chilcotin River.....	5, 6, 10, 11, 22, 35, 36, 37, 54, 55, 56, 79, 99, 108, 112, 119, 120, 123, 132, 133, 134, 152, 153, 154, 162.
Chimney Creek.....	34, 35, 55, 57, 108, 145
Clisbako River.....	22, 35, 37, 63, 123, 124
Gluculz Lake.....	13, 106, 107, 170, 171, 172
Coglistico River.....	132, 133, 152
Columbia River.....	5, 28, 38, 39, 183, 189
Cottonwood River.....	6, 79, 94, 95, 96, 101, 129, 136, 142, 146, 148, 159, 160, 161, 180, 181, 190
Cottonwood Canyon.....	77, 96, 110, 120, 142
Cranberry Lake.....	38, 39, 41, 59, 60, 158, 183
Crooked River.....	7, 8, 19, 20, 21, 23, 24, 32, 125, 128, 129
Dore River.....	70, 71, 73, 83, 84, 85
Eaglet Lake.....	6, 74, 75, 80, 81, 105, 106, 156
Euchiniko River and Lake.....	12, 35, 36, 37, 137, 145
Finlay River.....	5, 8, 9, 20, 21, 25, 26, 32, 33, 89, 90, 91, 125, 127, 128
Fraser River.....	5, 6, 7, 8, 10, 11, 13, 14, 15, 16, 17, 18, 19, 22, 23, 25, 26, 29, 30, 31, 35, 41, 42, 45, 46, 48, 49, 50, 51, 52, 54, 55, 56, 57, 58, 60, 67, 70, 71, 72, 73, 74, 76, 78, 79, 80, 81, 82, 83, 84, 85, 87, 91, 93, 94, 95, 96, 97, 100, 102, 104, 108, 110, 115, 117, 118, 119, 120, 122, 125, 127, 128, 129, 131, 137, 138, 139, 140, 141, 142, 145, 153, 154, 155, 156, 157, 158, 165, 167, 168, 169, 172, 173, 175, 176, 178, 180, 181, 183, 186, 189, 190, 192.
Giscome.....	5, 8, 15, 19, 23, 26, 49, 80, 105, 125, 128, 156
Goat River.....	41, 43, 46, 67, 68, 70, 73, 180, 181, 182
Grand Canyon.....	14, 15, 16, 17, 48, 49, 71, 73
Horsetly.....	6, 43, 60, 92, 93, 94, 98, 107, 112, 113, 114, 115, 120, 134, 135, 143, 144, 145, 147, 159
Jack of Clubs Lake.....	130
Lac la Hache.....	27, 28, 43, 120, 147, 148
McBride.....	67, 68, 73, 80, 82, 83, 84, 85, 86, 165, 173, 175, 176
McGregor River.....	14, 15, 16, 23, 25, 26, 73, 176, 177, 185, 186, 187, 188, 189
McLennan River.....	18, 19, 38, 40, 67, 70, 158
McLeod Lake and River.....	6, 7, 8, 20, 21, 24, 31, 32, 66, 125, 126
Mackin Creek.....	54, 56, 57, 79, 80, 115, 117, 118, 119, 162
Mahood Lake.....	44, 45
Manson Creek.....	26, 66, 88, 89, 90, 91
Meldrum Creek.....	54, 55, 56, 79, 80
Middle River.....	9
Moose Lake and River.....	17, 165, 166, 167
Morkill River.....	15, 43, 46, 70, 73, 74, 175
Narcosli Creek.....	50, 54, 58, 80, 115, 117, 118, 119, 132, 153, 154, 162, 164
Nataniko River.....	12
Nation River and Lakes.....	9, 21, 25, 33, 88, 89, 90, 128
Nazko River.....	12, 13, 22, 36, 63, 65, 78, 80, 116, 123, 124, 132, 133, 137, 145, 152, 153, 163
Nechako River.....	5, 6, 13, 14, 27, 28, 37, 52, 53, 63, 65, 73, 86, 87, 121, 122, 127, 128, 138, 148, 149, 150, 151, 154, 155, 157, 170, 171, 172, 177, 179, 180, 190.
Necoslie River.....	27, 65, 66
North Thompson River.....	38, 39, 40
Nulki Lake.....	64
Omineca River.....	26, 33, 90, 91
Pack River.....	8, 9, 20, 21, 24, 25, 32, 33, 126, 127

	PAGE.
Parsnip River.....	5, 6, 7, 8, 9, 19, 20, 21, 23, 24, 25, 26, 32, 33, 89, 90, 124, 125, 126, 127, 128
Peace River.....	6, 8, 9, 19, 20, 21, 25, 32, 33, 125, 127, 166, 176
Pelican Lake.....	12, 137, 163
Pine River.....	20, 21, 126
Prince George.....	5, 6, 7, 13, 47, 48, 49, 76, 82, 83, 86, 87, 91, 102, 105, 111, 120, 121, 122, 124, 137, 138, 139, 140, 142, 145, 149, 150, 151, 154, 155, 156, 157, 170, 172, 173, 176.
Quesnel.....	5, 6, 9, 47, 49, 50, 54, 60, 63, 76, 77, 78, 79, 80, 91, 94, 95, 97, 100, 101, 108, 110, 115, 116, 117, 120, 122, 124, 129, 132, 134, 135, 136, 137, 138, 139, 140, 141, 142, 145, 146, 147, 148, 152, 153, 159, 160, 161, 167, 168, 172, 182, 193.
Quesnel Lake.....	104, 112, 113, 114, 115, 131, 134, 135, 136, 147, 159, 167, 168, 169
Quesnel River.....	6, 49, 60, 61, 65, 92, 93, 94, 100, 101, 102, 103, 104, 109, 111, 112, 115, 120, 131, 136, 140, 142, 159, 160, 161, 168, 182.
Rocky Mountains.....	5, 6, 8, 9, 20, 21, 25, 32, 33, 60, 69, 82, 87, 89, 90, 184
Robson, Mount.....	18, 67, 70, 158, 165, 166, 167, 173, 176, 183, 184
Riske Creek.....	55, 57, 79, 80, 118, 119, 162
Salmon River.....	6, 7, 22, 26, 31, 32, 66, 67, 73, 124, 125, 127, 155, 157
San Jose Rive.....	23, 53, 61, 98
Sinkut River and Lake.....	64, 106
Soda Creek.....	6, 8, 49, 54, 55, 56, 57, 80, 99, 102, 104, 108, 109, 110, 115, 119, 140, 142, 145, 146, 168
Springhouse.....	10, 34, 55
Stuart Lake.....	5, 6, 7, 9, 20, 31, 32, 121, 189, 190, 191
Stuart River.....	6, 26, 27, 28, 31, 65, 121, 126, 171, 172, 178, 199, 180, 189, 190, 191
Summit Lake.....	8, 19, 23, 26, 124, 125, 127, 128
Takla Lake.....	9, 191
Temapho Lake.....	22, 23, 152
Tete Jaune Cache.....	18, 29, 30, 38, 39, 40, 41, 42, 49, 60, 67, 68, 71, 73, 82, 173
Torpy Creek.....	14, 15, 45, 46, 70, 72, 73, 74, 186, 187, 188, 189
Timothy Mountain.....	43
Vanderhoof.....	6, 106, 107, 120, 121, 145, 150, 151, 170, 172, 178, 179, 180, 190, 191
Williams Creek.....	6, 47, 48, 77, 130
Williams Lake.....	5, 34, 99, 100, 135, 143, 144, 145, 146, 147
Willow River.....	5, 6, 47, 73, 74, 79, 80, 81, 102, 105, 106, 134, 142, 156
Yellowstone Pass.....	5, 17, 29, 40, 42, 52, 73, 82, 83, 164, 165, 166, 167, 172, 174, 184

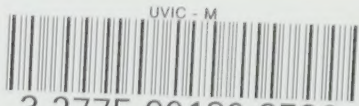
VICTORIA, B.C.:

Printed by CHARLES F. BANFIELD, Printer to the King's Most Excellent Majesty.
1929.

DATE

APR 06 1999

MAR 08 2001



UVIC - M

3 2775 90180 8526

